Core Knowledge® SCIENCE

Computers All Around Us

Laptops

Teacher Guide

Desktop computers

Tablets

Smartphones

Computers All Around Us

Teacher Guide

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Computers All Around Us

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Computers All Around Us

Teacher Guide

Core Knowledge Computer Science™ K

GRADE K

Introduction

About this Program

Core Knowledge Computer Science Conceptual Approach Framework

Grade	Title and Driving Question	Emphasis is on . . .	Overarching Unit Objective
K (ages 5–6)	**Computers All Around Us** What are computers and where can we find them?	recognizing	Identify computer devices and parts and operate them age-appropriately.
1 (ages 6–7)	**Helpful Computers** What can computer programs do?	using	Experience a variety of age-appropriate programs designed for different purposes.
2 (ages 7–8)	**Using Computers** How can we use computers and the internet?	using	Use a variety of age-appropriate programs and websites with increasing skill and independence under supervision.
3 (ages 8–9)	**Codes and Computers** How do programmers build computer programs?	deciphering and evaluating	Model use of symbols, codes, and steps in simple processes and problem solving.
4 (ages 9–10)	**Problem-Solving and Computers** What kinds of problems can we solve with computers?	deciphering and evaluating	Model solution design in increasing complexity and involving conditionals and loops.
5 (ages 10–11)	**Designing Computer Programs** What kinds of computer programs can I develop?	planning and designing	Write, evaluate, and debug code to execute grade-appropriate tasks.

Skills and Performance Summary

Grade K	The goal of the instruction and cumulative experiences in this unit is for young students to build a concept of what makes a thing a computer. Students think about how tools and devices can be helpful for completing tasks. Though students will not specifically study simple and compound machines in science until a later grade level,

	they are able from everyday exposure to differentiate devices that need a power source and those that do not. Within the class of devices that need a power source, students can form a further classification of electronic devices—ones that do something with information that is put into the device. Upon recognizing input-processing-output characteristics of devices, students can also begin to classify and use devices for different purposes, including playing games, communicating, and doing schoolwork.
Grade 1	Building on the recognition established in the previous grade, the goal of the instruction and cumulative experiences in this unit is for young students to begin using computer devices for various purposes, including game play, communication, and schoolwork. Through practice, students understand that the operation of devices has a series of steps in common, in which users input information, the device performs a process, and then a useful output occurs. Inputs include the use of a mouse, keyboard, touchscreen, game controller, camera, and microphone. Output includes screen visuals (text, still images, video), hard-copy printout, and audio. Accessing desired outputs from computers depends first on successful operation of input devices.
Grade 2	Building on the use of devices established in the previous grade, the goal of the instruction and cumulative experiences in this unit is for young students to continue using with increasing independence computer devices for various purposes, including game play, communication, and schoolwork. With increasing practice in successfully inputting information, students can consider ways to achieve creative outputs that use and combine text, graphics, visual data displays, photos, animations, video, and audio.
Grade 3	In this grade level, the emphasis begins to shift from use—skillfully inputting information to prompt outputs—to the unseen processes inside computing technology. The goal of the instruction and cumulative experiences in this unit is for students to identify the output of every computer device as a solution to a problem and deconstruct the solution into the necessary steps required. Students discern that computers do not think on their own to solve problems but only execute steps-by-step instructions that are built into them. And they begin to dissect messages into the granular parts that make them up and transmit them.
Grade 4	Building on the concepts of symbols, codes, signals, and step-by-step instructions established in the previous grade, the goal of the instruction and cumulative experiences in this unit is for students to continue articulating steps of increasingly complexity to solve problems. Beyond dissecting solutions into granular steps, students think forward in scenarios with conditional branching options (if-then statements) and loops (if-then, repeat prior instruction). Students relate what computing devices do to their programming, and they build understanding that complex computer programming is the outcome of building, layering, and chaining together links of fundamentally simple code.
Grade 5	In this grade level, the emphasis begins to shift from examination—figuring out how instructions make computing devices do what they do—to creative application of that knowledge. They step forward from the role of computer technology user into a beginning maker role. Students begin to use functional computer language to craft code for executable tasks.

Note to Teachers and Curriculum Planners

This unit introduces Grade K students to real-world examples and fundamental concepts related to devices that utilize computer technology. The unit includes a story-based Student Book and this Teacher Guide. The lesson sessions alternate between those focused on the Student Book and others that are interactive in nature and do not involve a Student Book chapter.

This unit can be integrated into your existing science or math curriculum. The lessons can be inserted intermittently, or the entire unit can be taught on consecutive days. The unit can also be offered as an enrichment course.

Standards: What are the relevant CSTA Concepts for this unit?*

This unit, *Computers All Around Us*, has been informed by the K–12 Computer Science Standards put forth by the Computer Science Teachers Association (CSTA). The CSTA K–12 Computer Science Standards delineate a core set of learning objectives designed to provide the foundation for computer science curricula and implementation at the K–12 level. The CSTA Standards introduce fundamental concepts of computer science beginning at the elementary school level.

Online Resources

For detailed information about the CSTA references, follow the links in the Online Resources Guide for this unit:

www.coreknowledge.org/cksci-online-resources

Grades K–2 CSTA Standards

Concepts	Subconcepts	Level 1A (ages 5-7) By the end of Grade 2, students will be able to . . .
Computing Systems	**Devices**	1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. (P1.1)
	Hardware and Software	1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware). (P7.2)
	Troubleshooting	1A-CS-03 Describe basic hardware and software problems using accurate terminology. (P6.2, P7.2)

*The K–12 Computer Science Framework, led by the Association for Computing Machinery, Code.org, Computer Science Teachers Association, Cyber Innovation Center, and National Math and Science Initiative in partnership with states and districts, informed the development of this work. Authors of the CSTA K–12 Computer Science Standards were not involved in the production of this product, and their endorsement is not implied.

Source:

Computer Science Teachers Association (2017). CSTA K-12 Computer Science Standards, Revised 2017. Retrieved from http://www.csteachers.org/standards.

K–12 Computer Science Framework. (2016). *Framework view by grade band*. Retrieved from http://www.k12cs.org

Concepts	Subconcepts	Level 1A (ages 5-7) By the end of Grade 2, students will be able to . . .
Networks and the Internet	**Cybersecurity**	1A-NI-04 Explain what passwords are and why we use them and use strong passwords to protect devices and information from unauthorized access. (P7.3)
Data and Analysis	**Storage**	1A-DA-05 Store, copy, search, retrieve, modify, and delete information using a computing device and define the information stored as data. (P4.2)
	Collection, Visualization, and Transformation	1A-DA-06 Collect and present the same data in various visual formats. (P7.1, P4.4)
	Inference and Models	1A-DA-07 Identify and describe patterns in data visualizations, such as charts or graphs, to make predictions. (P4.1)
Algorithms and Programming	**Algorithms**	1A-AP-08 Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks. (P4.4)
	Variables	1A-AP-09 Model the way programs store and manipulate data by using numbers or other symbols to represent information. (P4.4)
	Control	1A-AP-10 Develop programs with sequences and simple loops, to express ideas or address a problem. (P5.2)
	Modularity	1A-AP-11 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions. (P3.2)
	Program Development	1A-AP-12 Develop plans that describe a program's sequence of events, goals, and expected outcomes. (P5.1, P7.2)
		1A-AP-13 Give attribution when using the ideas and creations of others while developing programs. (P7.3)
		1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops. (P6.2)
		1A-AP-15 Using correct terminology, describe steps taken and choices made during the iterative process of program development. (P7.2)
Impacts of Computing	**Culture**	1A-IC-16 Compare how people live and work before and after the implementation or adoption of new computing technology. (P7.0)
	Social Interactions	1A-IC-17 Work respectfully and responsibly with others online. (P2.1)
	Safety, Ethics, and Law	1A-IC-18 Keep login information private, and log off of devices appropriately. (P7.3)

Integrated Practices

1. Fostering an Inclusive Computing Culture
    - 1.1 Include the unique perspectives of others . . .
    - 1.2 Address the needs of diverse end users . . .
    - 1.3 Employ self and peer-review advocacy . . .
2. Collaborating Around Computing
    - 2.1 Cultivate working relationships . . .
    - 2.2 Create team norms, expectations, and equitable workloads . . .
    - 2.3 Solicit and incorporate feedback . . .
    - 2.4 Evaluate and select technological tools . . .
3. Recognizing and Defining Computational Problems
    - 3.1 Identify complex, interdisciplinary, real-world problems . . .
    - 3.2 Decompose complex real-world problems . . .
    - 3.3 Evaluate whether it is appropriate and feasible . . .
4. Developing and Using Abstractions
    - 4.1 Extract common features . . .
    - 4.2 Evaluate existing technological functionalities . . .
    - 4.3 Create modules and develop points of interaction . . .
    - 4.4 Model phenomena and processes and simulate systems . . .
5. Creating Computational Artifacts
    - 5.1 Plan the development of a computational artifact . . .
    - 5.2 Create a computational artifact . . .
    - 5.3 Modify an existing artifact . . .
6. Testing and Refining Computational Artifacts
    - 6.1 Systematically test . . .
    - 6.2 Identify and fix errors . . .
    - 6.3 Evaluate and refine . . .
7. Communicating About Computing
    - 7.1 Select, organize, and interpret data sets . . .
    - 7.2 Describe, justify, and document computational processes . . .
    - 7.3 Articulate ideas responsibly . . .

(See *K12 Computer Science Framework* for full text of the Practices integrated into the standards.)

What Teachers Need to Know

Supportive information on the content standards and the concepts they address is provided throughout the lessons at points of relevance:

Know the Standards: These sections, found later in this Teacher Guide, explain what to teach and why, with reference to CSTA and Core Knowledge expectations.

Know the Science: These sections provide supporting, adult-level, background information or explanations related to specific computer science concepts or examples.

A Special Note to Kindergarten Teachers Before Starting This Unit

Why Study Computer Science in Kindergarten?

For many Kindergarten teachers, the suggestion that computer science should be a part of the Kindergarten curriculum may seem questionable. For many teachers, precious instructional time is devoted to teaching students reading and math fundamentals.

The study of computer science in Kindergarten, however, is consistent with the Core Knowledge approach to learning. Knowledge builds upon knowledge, and computer science builds upon the foundational understanding that many devices share basic underlying technology. And that technology operates through shared processes that are simple at their core but are combined in increasingly complex ways that can produce unlimited outcomes. Kindergarten children can learn to recognize devices and describe what those devices can do. They can also consider step-by-step instructions, if-then scenarios, and simple codes that carry meaning. These building blocks promote readiness for students to put concepts together and make their own instructional codes in later elementary grades.

Using the Student Book

Student Book

The *Computers All Around Us* Student Book includes eight chapters, intended to be read aloud by the teacher as the students look at images on each page.

As you will note when you examine the Student Book, limited text is included on each page. Instead, colorful and engaging illustrations dominate the Student Book pages. The design of the Student Book in this way is intentional because students in Kindergarten–Grade 2 are just learning to read. At these grade levels, students are learning how to decode written words, so the complexity and amount of text that these young students can actually read is quite limited.

While some advanced students may be able to read words on a given page of the Student Book, as a general rule, students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

The intent of the Grades K–2 Core Knowledge Computer Science lessons is to build students' understanding and knowledge of computer science concepts, as well as of associated practices and skills. It is for this very reason that in Grades K–2 the core content of each lesson is reinforced to students using a teacher Read Aloud, accompanied by example images and diagrams. Cognitive science research has clearly documented that students' listening comprehension far surpasses their reading comprehension well into the late elementary and early middle school grades. Said another way, students are able to understand and grasp far more complex ideas and text that they hear read aloud than they would ever be able to read or comprehend when they read to themselves. For a more thorough discussion of listening and reading comprehension and the underlying cognitive science research, teachers may want to refer to Appendix A of the Common Core State Standards for English Language Arts, noting in particular the Speaking and Listening section of the appendix.

Online Resources

Use this link to download the Online Resources for this unit, where the specific link to this appendix can be found:

www.coreknowledge.org/cksci-online-resources

Using the Teacher Guide

Instructional Design

The *Computers All Around Us* unit is the Kindergarten installment in the Core Knowledge Computer Science elementary series. To meet CSTA Standards we encourage teachers to complete the corresponding grade-level unit each school year. Each lesson part requires thirty to forty-five minutes of instruction time. The time it takes to complete a full lesson depends on class size and individual circumstances.

Within the Teacher Guide, each Core Lesson is generally composed of two or three parts. Each segment concludes with a Check for Understanding, providing the teacher with a quick opportunity for formative assessment. At the end of this unit Introduction, you will find a blank Pacing Guide, which you may use to plan how you might pace the lessons. We strongly recommend that you preview the unit in full before beginning instruction. This will help you prepare your pacing guide before teaching the first lesson.

Features

The unit is composed with several integrated features that support learning for all students and development for teachers.

Unplugged **Device-Based** **Online Resources**	This computer science unit can be completed BOTH in classrooms that have computers and devices for students and those that do not. Look for the icons at left to indicate the types of student interactions recommended within each lesson. Pay attention to those icons most relevant to your classroom situation. There are many opportunities for students to complete foundational exercises relevant to the concepts of computer science without needing access to computers. These activities are designated by the Unplugged icon. Several activities and extensions do require that students work on computers, and those experiences are designated by the Device-Based icon. A few activities and demonstrations recommended in this unit require the use of internet-connected devices. These experiences are indicated by the Online icon and will also include references to the Online Resources Guide for links to the recommended internet resources.
Differentiation	Adjustments to instruction appear in the text, indicated by **SUPPORT**, **EXTEND**, and **CHALLENGE** notations. **SUPPORT**—Reading, writing, listening, and/or speaking alternatives appear for students who are English language learners, have special needs, or read below the grade level. Extra support is suggested for students who struggle to meet targeted expectations. **EXTEND**—Extensions are suggested for students with high interest or who have already met the performance expectations. **CHALLENGE**—Additional, relevant, and interesting exercises are suggested for students to explore that exercise math, reading, or science skills/comprehension that push beyond the grade level.
Teacher Development	Information in the instructional text, Know the Science boxes, and Know the Standards boxes is provided to support ongoing teacher development with regard to both content and the teaching process.
Monitor Progress	Opportunities for formative assessment appear throughout the instructional support. These instances are most consistently noted in a Check for Understanding that concludes each lesson segment.

The Core Lessons

- Lesson time: Each Core Lesson part constitutes one classroom session of thirty to forty-five minutes. Some activities and performance tasks will require setting aside a longer block of time.
- Lesson order: The lesson parts are coherently sequenced to build from one to the next, linking student engagement across lessons and helping students build new learning on prior knowledge.

Driving Question: What are computers, and where do we find them?		
Overarching Unit Objective: Identify computer devices and parts, and operate them age-appropriately.		
Lesson and Part	**Title**	**Interaction Type and Learning Objective**
Lesson 1, Part 1	Electronic Devices	Student Book Read Aloud: Chapter 1, "Electronic Devices" • Recognize electronic devices.
Lesson 1, Part 2	What Are Electronic Devices?	Classroom Interactive • Identify devices that are electronic (must have a source of power to turn on). • Recognize the difference between devices that can accept input and those that cannot.
Lesson 2, Part 1	Computers	Student Book Read Aloud: Chapter 2, "Computers" • Identify computer devices and parts.
Lesson 2, Part 2	A Closer Look at Computers	Classroom Interactive • Recognize that a computer is an electronic device that can receive input to do tasks. • Name common activities that can be done on a desktop computer. • Identify basic components of a desktop computer.
Lesson 3, Part 1	Laptops	Student Book Read Aloud: Chapter 3, "Laptops" • Identify computer devices and parts. • Recognize laptop or notebook computers and their similarities to desktop computers.
Lesson 3, Part 2	How Is a Laptop Different from a Desktop Computer?	Classroom Interactive • Explain how a laptop computer can be portable. • Identify icons that are symbols for computer components and apps.
Lesson 4, Part 1	Tablets	Student Book Read Aloud: Chapter 4, "Tablets" • Recognize tablet devices as computers.
Lesson 4, Part 2	Apps on a Tablet	Classroom Interactive • Describe how an app is selected on a tablet that does not have a keyboard or a mouse. • Explain how icons or symbols can represent an app and other computer functions.
Lesson 5, Part 1	Smartphones	Student Book Read Aloud: Chapter 5, "Smartphones" • Recognize a smartphone and categorize it as a computer device.

Lesson 5, Part 2	What Can a smartphone Do?	Classroom Interactive • Explain how a smartphone is similar to and different from tablets and computers. • Describe how a smartphone replaces so many previous technology tools all in one portable device.
Lesson 6, Part 1	Connected Computers	Student Book Read Aloud: Chapter 6, "Connected Computers" • Recognize that one computer device can send information to another.
Lesson 6, Part 2	How Can We Use the Internet Safely?	Classroom Interactive • Recognize that computers can communicate over the internet. • Explain why staying safe and respectful on the internet is important. • Understand what a strong password means.
Lesson 7, Part 1	Game Devices	Student Book Read Aloud: Chapter 7, "Game Devices" • Recognize digital game devices as types of computers.
Lesson 7, Part 2	How Is a Controller Like a Mouse?	Classroom Interactive • Understand the basic functionality of a game controller.
Lesson 8, Part 1	Telling Computers What to Do	Student Book Read Aloud: Chapter 8, "Telling Computers What to Do" • Recognize a range of computer capabilities.
Lesson 8, Part 2	Typing, Pointing, and Clicking	Classroom Interactive • Identify various ways that information can be input into a computing device.

Activity Pages

Activity Pages

AP 1.2
AP 2.2
AP 3.2
AP 5.2

Blackline reproducible masters for Activity Pages are included in Teacher Resources at the back of the Teacher Guide. The icon shown to the left appears throughout the Teacher Guide wherever Activity Pages (AP) are referenced.

The Activity Pages can be organized into a learning portfolio for each student to demonstrate their progress relative to expectations and as student work products.

Make sufficient copies for your students in advance of each lesson.

Lesson 1, Part 2—Electronic Device Scavenger Hunt (AP 1.2)

Lesson 2, Part 2—Parts of a Computer (AP 2.2)

Lesson 3, Part 2—Laptops (AP 3.2)

Lesson 5, Part 2—Old Devices, New Apps (AP 5.2)

Online Resources for Science

Online Resources

For each CKSci Computer Science unit, the Teacher Guide includes references to online resources (including external websites and downloadable documents) to enhance classroom instruction. Look for the icon on the left.

Use this link to download the CKSci Online Resources for this unit:

www.coreknowledge.org/cksci-online-resources

Teaching Strategies

Start with the familiar.	Lead with an experience. Begin each lesson with a demonstration, activity, or question about a phenomenon to engage students and focus their attention on the topic. Start with the familiar. Every science topic introduced to students relates in some way to their known world and everyday experiences. The purpose of every lesson is to build a bridge between what is familiar to students and broader knowledge about the way the world works.
Ask driving questions.	Each multipart lesson contributes to the unit's Driving Question. And at the beginning of each Teacher Guide lesson segment, you will find a reminder of the Overarching Unit Objective. Each lesson activity provides an incremental concept to help students move toward the objective and ultimately be able to offer a confident answer to the Driving Question. Pose discussion questions in each class session with the Driving Question and Overarching Unit Objective in mind.
Encourage scientific thinking.	Approach the lessons with students not as learning about computer science, but as learning about the world with a scientific mind. Throughout the lessons, encourage students to ask questions about what they observe, do, and read. Record relevant questions in a prominent place in the classroom. Guide students back to these questions as opportunities to answer them emerge from readings, demonstrations, and activities.
Use continuous Core Vocabulary instruction.	During instruction, emphasize Core Vocabulary terms and their meanings in context rather than relying on isolated drill for memorization of definitions. Through scaffolded questioning, encourage students to come up with definitions in their own words and to use the words in their own sentences. Core Vocabulary words for each lesson, as well as Language of Instruction and other key terms teachers are encouraged to use in discussing topics with students, are provided at the start of each lesson. You can find Core Vocabulary and selected Language of Instruction definitions in the Glossary at the back of this Teacher Guide.
Emphasize observation and experience.	Lessons employ various ways for students to learn, including watching, listening, reading, doing, discussing, and writing.

Make frequent connections.	Use a combination of demonstrations and reading materials, rich with examples, to help students recognize how the concepts they are learning apply in their everyday lives. Prompt students to relate lesson content to their own experiences, to relate the new and unfamiliar to the familiar, and to connect ideas and examples across disciplines.
Monitor student progress.	Use verbal questioning, student work, and the Check for Understanding prompts at the end of each lesson part to monitor progress during each lesson and to measure understanding at the conclusion of the unit. Many lessons provide tips to help you support students who need further explanations or clarifications.

Effective and Safe Classroom and Online Activities

Conducting safe classroom demonstrations and activities and safe online interactions is essential to successful elementary education. The following resources, included at the back of the Teacher Guide, provide Core Knowledge's recommendations for developing effective science and computer science classroom activities:

- Internet Safety
- Student Online Safety Contract
- Strategies for Acquiring Materials

Online Resources

These resources may also be accessed within the CKSci Online Resources Guide for this unit:

www.coreknowledge.org/cksci-online-resources

Materials and Equipment

The unit requires a variety of materials to support various ways of learning (including doing, discussing, listening, watching, reading, and writing). Prepare in advance by collecting the materials and equipment needed for all of the demonstrations and hands-on investigations.

- A large whiteboard, blank sheets of printer paper, student notebooks, pencils, and scissors are routinely required but not listed below.
- A classroom computer, tablet, or other computing device, as needed for discussion, is referred to in the materials for lesson segments in which it is used but is not repeated in the materials listed here. Internet access and the means to project images/videos for whole-class viewing are also required in many lesson segments but not repeated below.

Lesson 1, Part 2

- electronic devices around the classroom

Lesson 2, Part 1

- enlarged outline of a desktop computer either drawn on chart paper or displayed digitally
- printed vocabulary words and a means for students to stick labels to the diagram.

Lesson 2, Part 2

- desktop computer or image of desktop computer

Lesson 3, Part 1

- printout or display of local restaurant/store icons (no words, just the symbols)
- printout or display of commonly used apps

Lesson 3, Part 2

- laptop computer for demonstration or an image of a laptop computer

Lesson 4, Part 1

- tablet device if available, or a printed or on-screen image of a tablet

Lesson 4, Part 2

- tablet device if available, or a printed or on-screen image of a tablet

Lesson 5, Part 2

- paper clips
- phone with buttons and/or an even older phone such as one with a rotary dial

Lesson 6, Part 1

- computer with email application for demonstration
- poster paper

Lesson 8, Part 2

- tape

Computers All Around Us Pacing

_____**'s Class**

Note to Teacher: *Computers All Around Us* can be taught on consecutive days as a supplemental unit to your science or math curriculum. It can also be offered as an enrichment program. If the program is implimented in consecutive thirty to forty-five-minute class sessions, it will take sixteen days to complete.

Week 1

Day 1	Day 2	Day 3	Day 4	Day 5

Week 2

Day 6	Day 7	Day 8	Day 9	Day 10

Week 3

Day 11	Day 12	Day 13	Day 14	Day 15

Week 4

Day 16				

LESSON 1, PART 1

Electronic Devices

Driving Question: What are computers, and where can we find them?

Overarching Unit Objective: Identify computer devices and parts, and operate them age-appropriately.

At a Glance

Learning Objective

✓ Recognize electronic devices.

Instructional Activities

- teacher Read Aloud
- whole-class discussion

CSTA Standards

Concept: Computing Systems

Subconcept and Standard: Devices: 1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. (P1.1)

For detailed information about the CSTA Standards, follow the links in the Online Resources Guide for this unit:

www.coreknowledge.org/cksci-online-resources

Core Vocabulary and Language of Instruction

A Glossary at the end of this Teacher Guide lists definitions for Core Vocabulary and selected Language of Instruction.

Core Vocabulary terms are those that students should learn to use accurately in discussion. During instruction, expose students repeatedly to these terms but not through isolated drill or memorization.

battery **plug** **power**

Language of Instruction consists of additional terms that you should use when talking about concepts in the lesson. Students benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves.

device **electronic**

Instructional Resource

Student Book

Ch. 1

Student Book, Chapter 1
Electronic Devices

Materials and Equipment

Collect or prepare the following:

- blank sheets of paper
- pencils or crayons

The Core Lesson

1. Focus attention on today's topic.

Tell students they will be learning about electronic devices in this chapter. Ask them to look around the room and raise their hands to share what electronic devices they can see from their seats.

2. Read together "Electronic Devices."

Student Book

Ch. 1

While some students may be able to read words on a given page of the Student Book, students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

Know the Standards

For students to conceptualize what makes a computer a computer, they need to build a foundation for understanding by classifying familiar objects. This chapter is the entry point for the following conceptual construction:

- Devices are objects that perform tasks.
- Electrical devices require energy, which they get from being plugged in or from batteries.
- Some powered devices only turn on or off; these would be referred to as "electrical" but not "electronic devices."
- Other powered devices perform operations based on variable input; these are electronic devices.
- Computers, computational devices, process inputs according to programmed instructions to perform tasks.

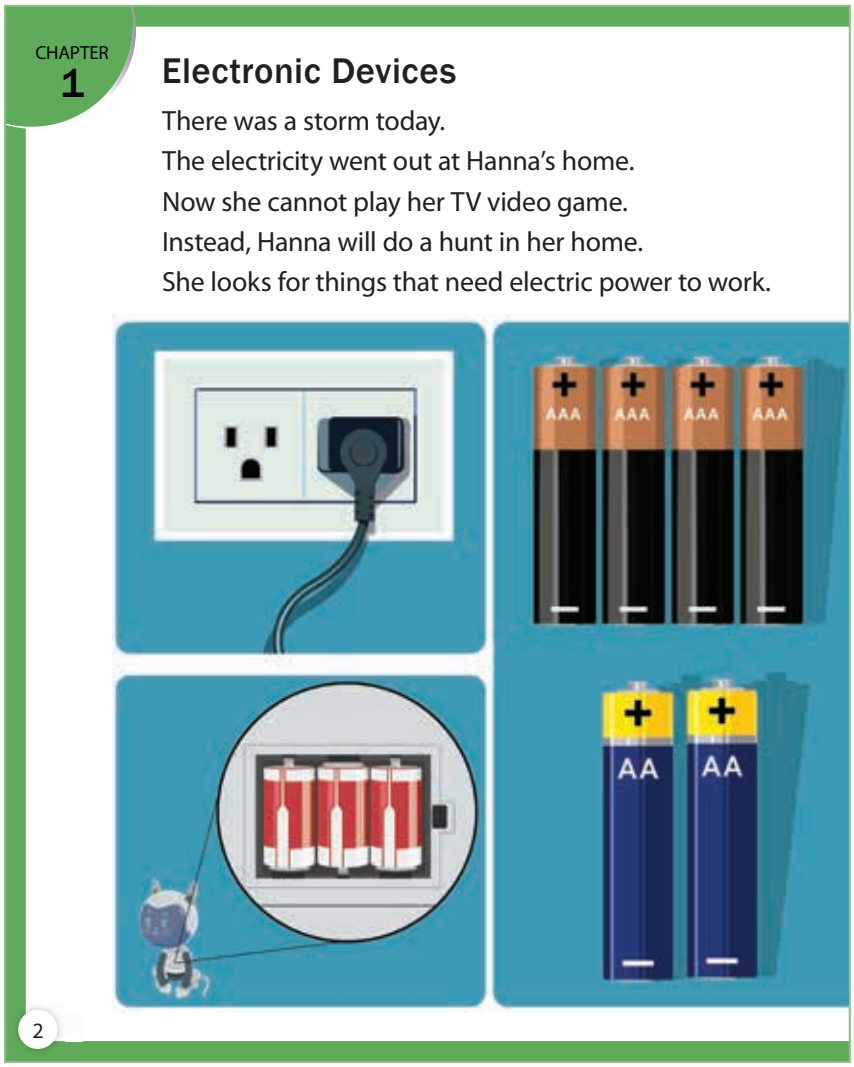
Read Aloud Support

Ask students to turn to page 2 of the Student Book and look at the images as you read aloud. Remind them that the title of this chapter is "Electronic Devices," and tell them to pay special attention to the devices they may recognize as you read.

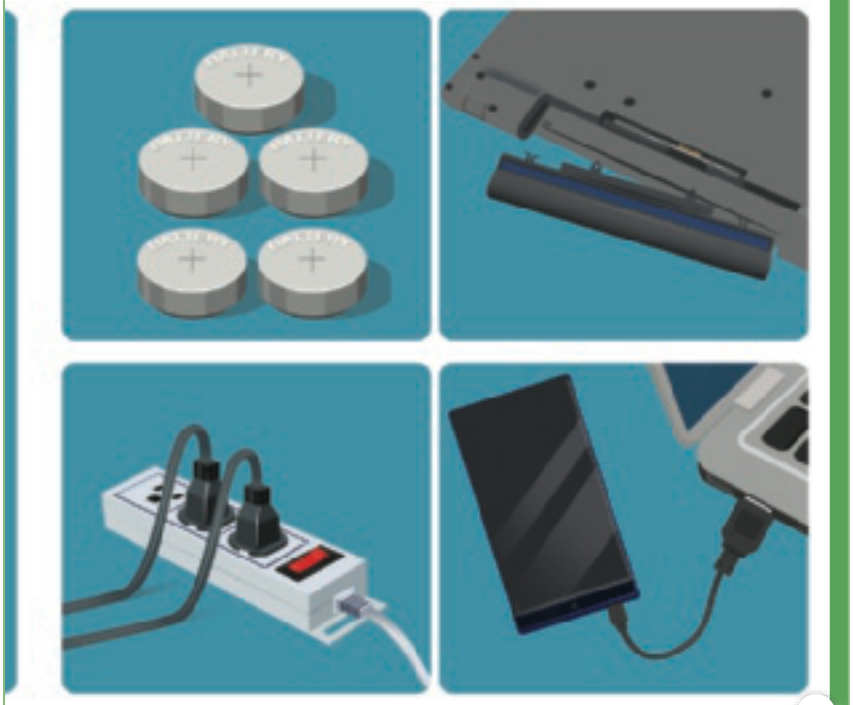
Pages 2–3

Ask students to look at the pictures on pages 2 and 3. Invite students to share experiences they might have had when the power went out and how they spent that time. Talk about where students have seen batteries before and where they have seen wall sockets. Point out examples that are visible in the classroom.

- **SAFETY**—Take the opportunity to remind students about safety. Tell them that:
- they should never place anything into electrical outlets.
- they should ask an adult to plug devices in for them.
- batteries should only be handled by adults.



Hanna looks for devices that turn on and off.
Some of the devices are plugged into wall outlets.
Those things do not work when the power is out.
But other devices still work with the power out.
Those devices get their power from batteries.
You might not see the batteries.



3

Ask students the following questions:

LITERAL—What kinds of devices is Hanna looking for?

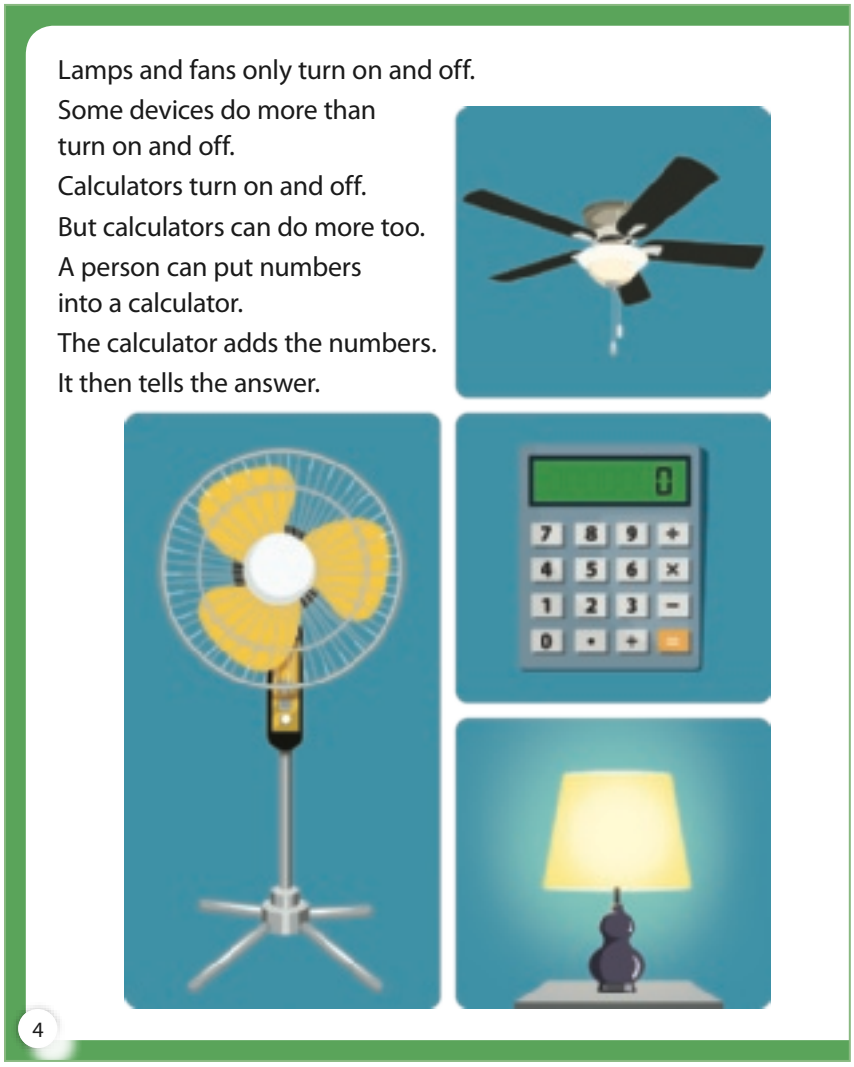
» is looking for things that turn on and off. Some are devices that are plugged into walls and others are devices that are powered by batteries.

INFERENTIAL—Why do some devices still work when the power is out?

» They are devices that get their power from batteries.

Page 4

Ask students to look at the pictures on page 4 as you read aloud. Discuss that devices power on in different ways and that sometimes we can power on a device and the process ends there (the device turns on). However, some devices can do more when we power them on by us inputting information.


Lamps and fans only turn on and off.
Some devices do more than turn on and off.
Calculators turn on and off.
But calculators can do more too.
A person can put numbers into a calculator.
The calculator adds the numbers.
It then tells the answer.
4

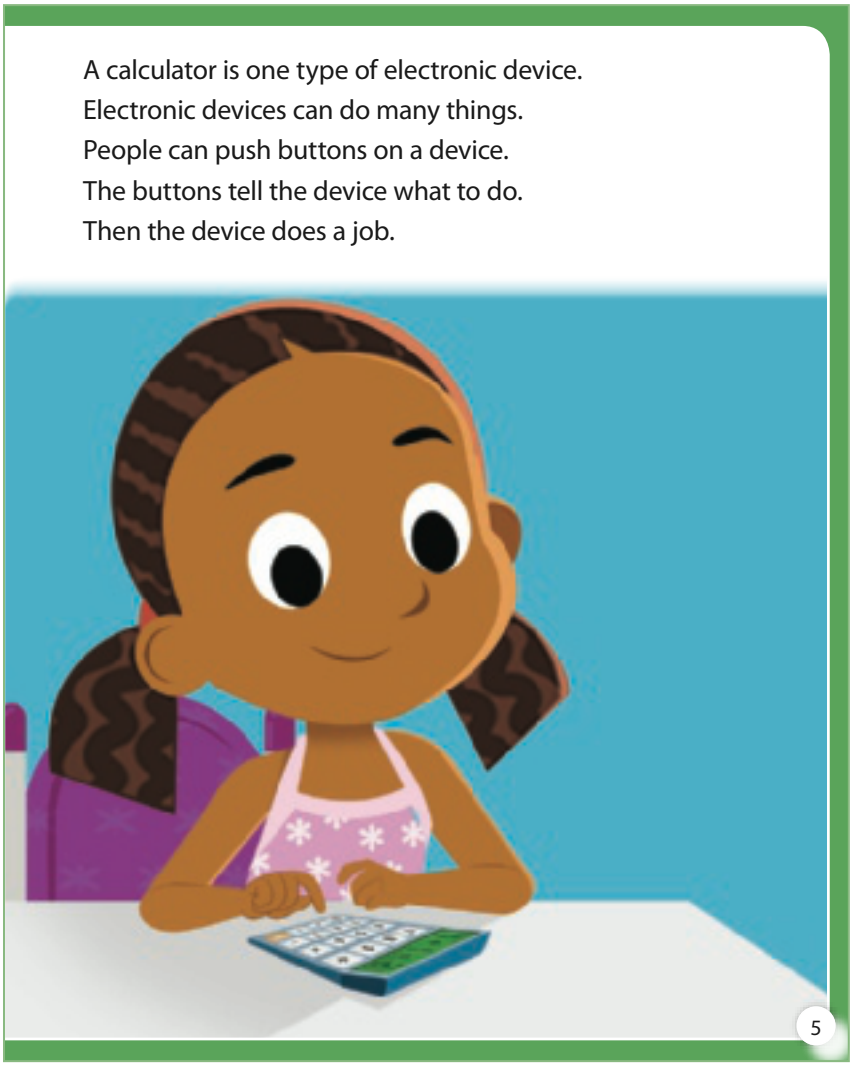
Ask students the following questions:

LITERAL—How are lamps and fans different from calculators?

» Lamps and fans just power on and off while calculators can add numbers and tell answers.

Page 5

Ask students to look at the picture on page 5. Explain that it shows Hanna using an electronic device called a calculator.


A calculator is one type of electronic device.
Electronic devices can do many things.
People can push buttons on a device.
The buttons tell the device what to do.
Then the device does a job.
5

Ask students the following questions:

LITERAL—What kinds of things can an electronic device do?

» Electronic devices can do more than turn on and off. People can push buttons on the device that tell the device to do a job.

INFERENTIAL—What job can a calculator do?

» It can add numbers together.

EVALUATIVE—Do you think that some devices are more important than others? Are lamps and fans more important than calculators?

» Student opinions will vary, but you may guide a discussion that includes that people can use devices in different ways. So, while they may have different functions, one is likely not more important than another.

Pages 6–7 **Ask students to look at the pictures on pages 6 and 7.** Talk about how each of the example devices in these rooms is powered. Invite students to share additional examples that they can think of.

Hanna looks for electronic devices in each room.
Her electric toothbrush is in the bathroom.
A toy train is in her bedroom.
She sees an oven in the kitchen.
6
She sees her sister's computer.
Her dad is using a flashlight.
And her mom is looking at her phone.
7

Ask students the following questions:

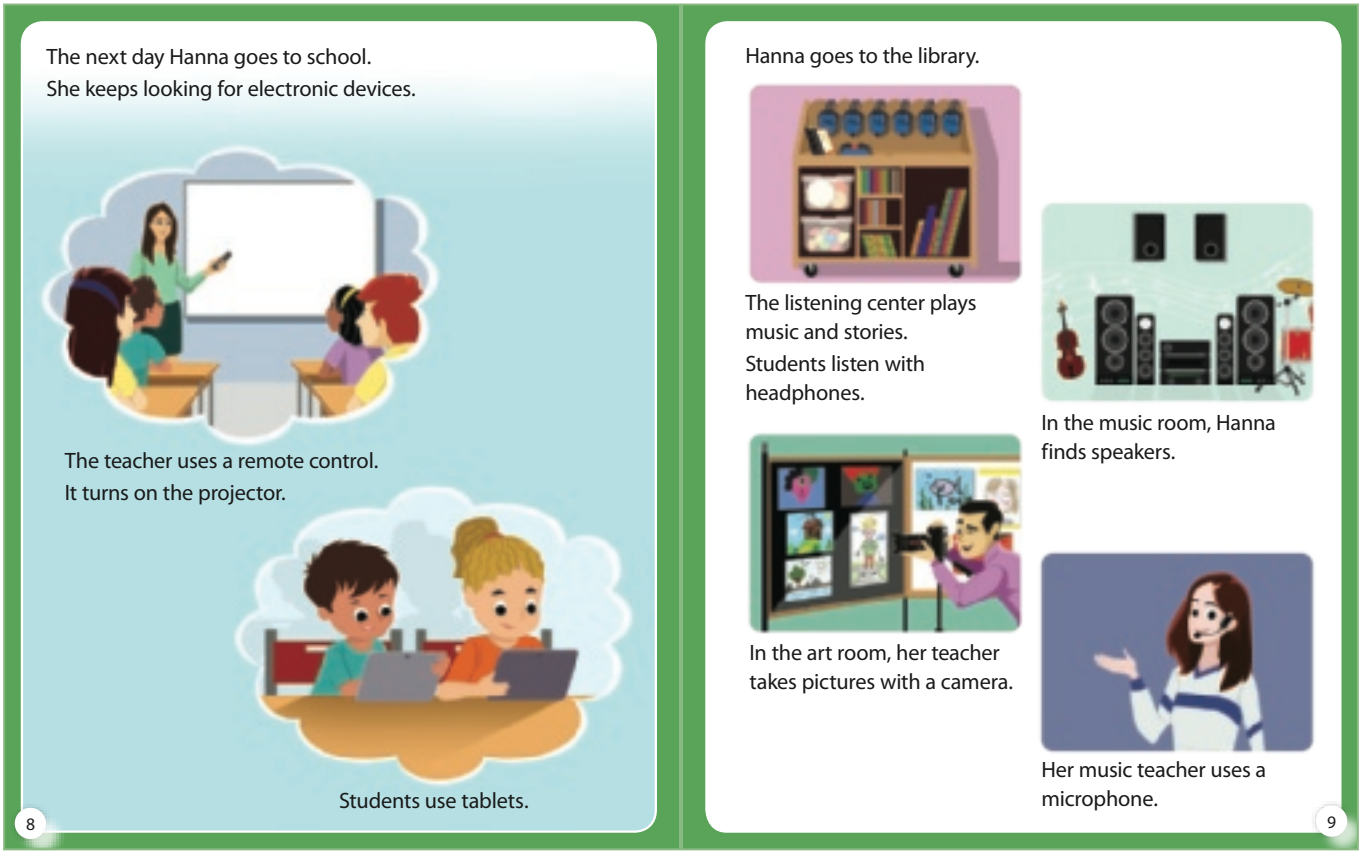
LITERAL—Which devices in the pictures are plugged in? Which devices are using batteries for power?

» The oven and the computer are likely plugged in while the electric toothbrush, toy train, flashlight, and phone are likely battery powered.

LITERAL—Which of the devices in the pictures are ones that only turn on and off? Which have information input into them and can do a job?

» The electric toothbrush and flashlight only turn on and off. The toy train powers on and moves in a forward direction. The oven turns on and then heats up to the intended temperature and cooks food. The computer and phone can do many different jobs after information is input into them.

Pages 8–9 **Ask students to look at the pictures on pages 8 and 9.** Talk about how Hanna is visiting different places, but still sees electronic devices. Ask students to list the devices they see in the pictures.


The next day Hanna goes to school.
She keeps looking for electronic devices.
The teacher uses a remote control.
It turns on the projector.
Students use tablets.
8
Hanna goes to the library.
The listening center plays music and stories.
Students listen with headphones.
In the music room, Hanna finds speakers.
In the art room, her teacher takes pictures with a camera.
Her music teacher uses a microphone.
9

3. Check for understanding.

Unplugged Activity

Give students a piece of paper, and have them fold it in half. Ask them to think about an electronic device they see in the room or one they recall from home. Have them draw a picture of the device on one side of the paper. On the other side of the paper, ask them to draw a picture of the device being used for what it does.

SUPPORT—For students who still need support understanding the difference between "on and off" and doing a job, have them watch how the lights in the room turn on and do nothing else. Then have them observe how you turn on your computer or tablet, and show them how you type in your password or click on an app that prompts the device to do more than simply power up.

LESSON 1, PART 2

What Are Electronic Devices?

Driving Question: What are computers, and where can we find them?

Overarching Unit Objective: Identify computer devices and parts, and operate them age appropriately.

At a Glance

Learning Objectives

- ✓ Identify devices that are electronic (must have a source of power to turn on).
- ✓ Recognize the difference between devices that can accept input and those that cannot.

Instructional Activities

- whole-class discussion
- guided activity

CSTA Standards

Concept: Computing Systems

Subconcepts and Standards:

Hardware and Software: 1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).

Troubleshooting: 1A-CS-03 Describe basic hardware and software problems using accurate terminology.

For detailed information about the CSTA Standards, follow the links in the Online Resources Guide for this unit:

www.coreknowledge.org/cksci-online-resources

Core Vocabulary and Language of Instruction

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battery **on and off** **outlet** **plug** **switch**

Language of Instruction consists of additional terms that you should use when talking about concepts in the lesson. Students benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves.

device **electricity** **electronic** **input** **power**

Materials and Equipment

Collect or prepare the following:

- electronic devices around the classroom
- pencils or crayons

Activity Page

AP 1.2

Activity Page 1.2

Electronic Device Scavenger Hunt (AP 1.2)

Advance Preparation

- Make sufficient copies of AP 1.2 for all students in the class.
- Complete the Activity Page on your own, listing each electronic device in the class and the total in each category.

The Core Lesson

1. Focus attention on today's topic.

Lead a discussion with students about electronic devices. Explain that devices that turn on and off, or have power, are electronic. Ask students if they can name one way a device gets power. Point to something in the classroom that has a switch, and demonstrate using the switch to turn it on and off. Next, point to a device that is plugged into a wall outlet. If possible, turn it on and off, and then pull the plug to demonstrate that it no longer turns on. Demonstrate the same with a battery-operated device. Ask students what is different between a calculator or a computer versus a fan or a light, which are all electronic devices. Describe how a calculator or a computer can have information entered into it to process or do a job, whereas a light or fan can only be turned on or off.

2. Facilitate the activity.

Unplugged Activity

1. Distribute copies of AP 1.2 to students.
2. Tell students they will carefully explore the classroom for electronic devices. Remind them that electronic devices might plug into a wall outlet, have a switch, or use batteries. Instruct them not to touch any electrical parts, such as outlets, plugs, or switches.

Activity Page

AP 1.2

3. Each time they find a device, they should add a tally mark into the appropriate box on their page. Explain that a tally mark is like writing the number 1 for each item.
4. They should also consider which devices are able to receive input. They should circle the tally mark for each device that can receive input.
5. When students are done hunting for all the electronic devices, they should count the tally marks and write the number found in each category.
6. Students should also count the tally marks they circled and write the number of devices with input they found.

3. Check for understanding.

Unplugged Activity

Referring to the list you created prior to class, ask students to share their totals with the rest of the class. Reading your list for each category, point to each applicable item in the classroom, and ask students to raise their hands if they found and tallied it. Invite students to share any items they found that were not on your list.

EXTEND—Send a second copy of AP 1.2 home with each student to complete the electronic device scavenger hunt at home.

CHALLENGE—If time and ability allow, encourage students to use a word or a simple drawing for each electronic device found instead of a simple tally mark. They should still circle those that can receive input and complete their totals for all devices found.

Know the Standards

1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware). When communicating about computing devices, it is important to describe basic hardware and software components with accurate terminology. Hardware components of a computer system can include desktop computers, laptop computers, CPUs, tablet devices, monitors, keyboards, mice, speakers, and printers. A wide variety of software applications can be used to perform tasks based on the needs of the user. Common software types include word processors, spreadsheets, presentation software, databases, drawing programs, social media, and web browsers.

1A-CS-03 Describe basic hardware and software problems using accurate terminology. A computing system is composed of hardware and software. Hardware consists of physical components. Students should be able to identify and describe the function of external hardware, such as desktop computers, laptop computers, tablet devices, monitors, keyboards, mice, and printers.

LESSON 2, PART 1

Computers

Driving Question: What are computers, and where can we find them?

Overarching Unit Objective: Identify computer devices and parts, and operate them age-appropriately.

At a Glance

Learning Objective

✓ Identify computer devices and parts.

Instructional Activities

- teacher Read Aloud
- whole-class discussion

CSTA Standards

Concept: Computing Systems

Subconcept and Standard: Devices: 1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use.

For detailed information about the CSTA Standards, follow the links in the Online Resources Guide for this unit:

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computer **keyboard** **mouse**

Language of Instruction consists of additional terms that you should use when talking about concepts in the lesson. Students benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves.

computer **desktop** **monitor**

Instructional Resource

Student Book

Ch. 2

Student Book, Chapter 2
Computers

Materials and Equipment

Collect or prepare the following:

- internet access and the means to project images/video for whole-class viewing
- enlarged outline of a desktop computer either drawn on chart paper or displayed digitally
- printed vocabulary words and means for students to stick labels to the diagram

The Core Lesson

1. Focus attention on today's topic.

Tell students they are going to learn about computers. Ask students: What are computers? Listen to student responses, then follow up and ask: What are computers used for?

2. Read together "Computers."

Student Book

Ch. 2

While some students may be able to read words on a given page of the Student Book, students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

Read Aloud Support

Ask students to turn to pages 10 and 11 of the Student Book and look at the images as you read aloud. Remind them that the title of this chapter is "Computers," and tell them to pay special attention to where the pictures of the computers are as you read.

Pages 10–11

Ask students to look at the pictures on pages 10 and 11. Talk about what they notice about where the computers in the pictures are. Prompt students to notice that the computers have different parts. And they all have screens that sit on a desk or tabletop surface. The "computer" part that looks like a metal box could be under the desk or on top of the desk. If it is on top of the desk, the monitor might be sitting on top of it.

CHAPTER 2

Computers

Hanna uses a computer at school.
The computer is on a desk.
It stays in one place.
It is called a desktop computer.

10

A computer is a kind of electronic device.
You can put information into it by clicking or typing.
The information tells the computer what to do.
Computers can be used to do many things.

11

Ask students the following questions:

INFERENTIAL—Why are computers like tese called "desktop computers"?

» Because they sit on top of desks or tables while they are used.

INFERENTIAL—How does a computer know what to do?

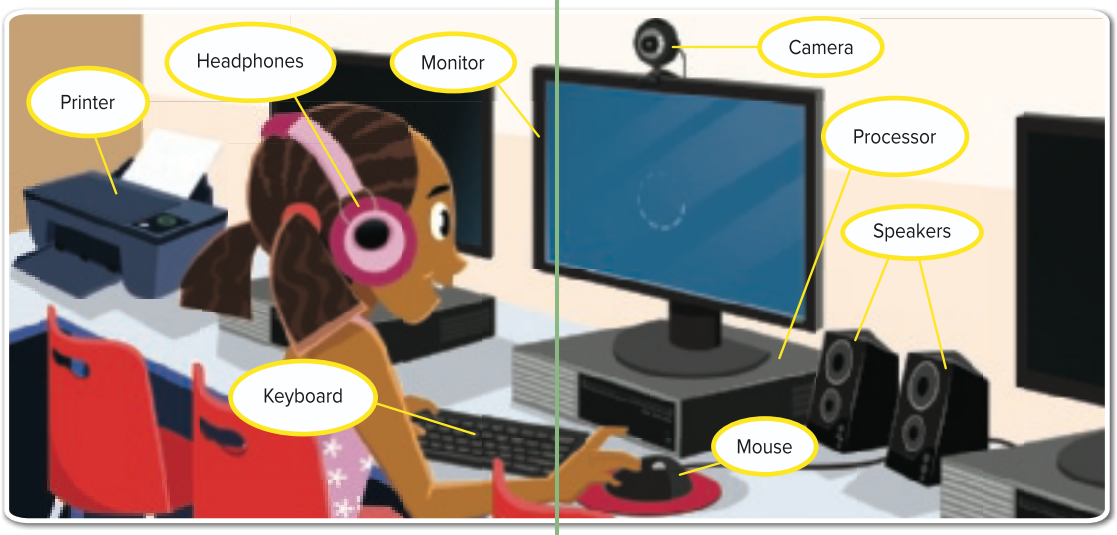
» It knows what to do from the information that is put into it.

Elaborate so that students understand that most information is input by pushing buttons to type or click, but increasingly computers can also receive information through voice commands.

Pages 12–13 **Ask students to look at the picture across pages 12 and 13.** Explain that it shows the different parts computers can have, including the devices that can plug into computers.

A computer has many parts.
Some parts you can see.
You can see a monitor and speakers.
You can see a keyboard and a mouse.
Other parts you cannot see.
You cannot see the processor.

The processor makes a computer work.
It is inside the computer box.
The box has a button to turn the computer on.
It also has slots to plug cords into.
Some monitors have cameras.
Printers can be used with computers.
Headphones can be used, too.



12 13

Ask students the following questions:

LITERAL—What are some parts of a computer?

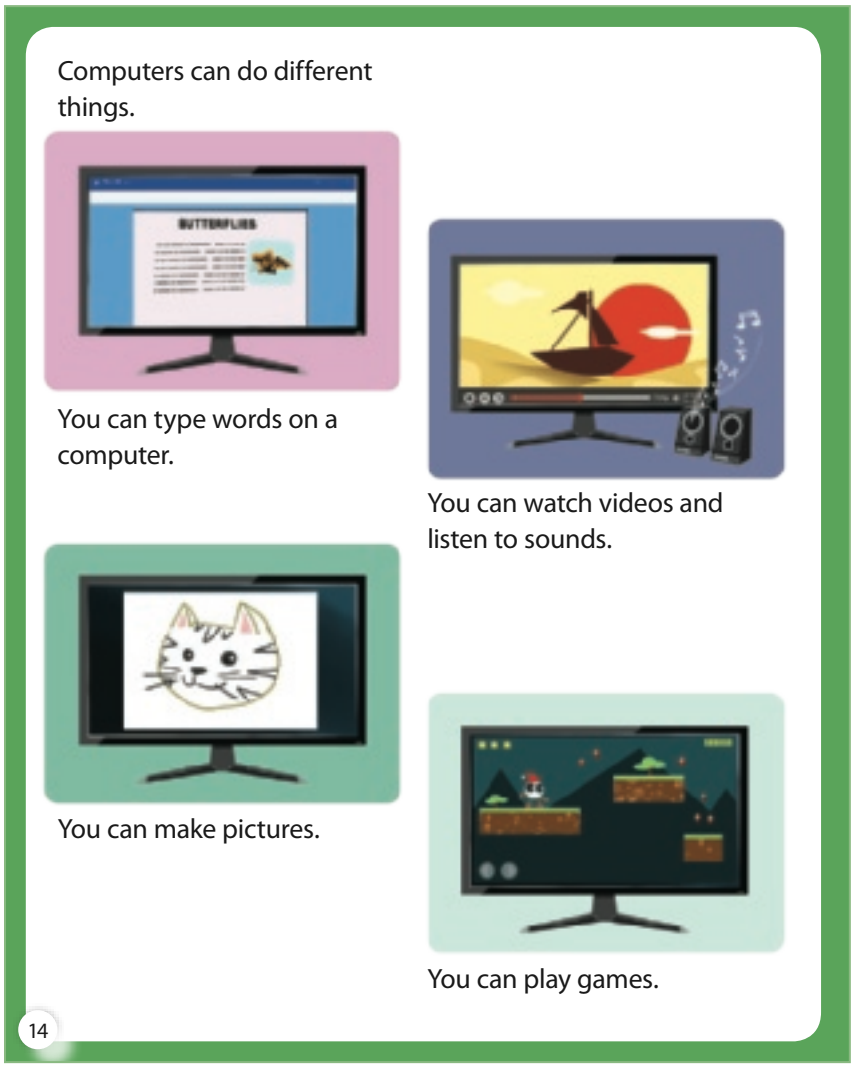
» Some parts of a computer are a screen, a speakers, keyboard, a mouse, a monitor, and a processor.

LITERAL—What are some things that can be used with computers?

» Some things that can be used with computers are cameras, printers, and headphones.

Page 14

Ask students to look at the pictures on page 14 as you read aloud. Discuss what students see on the screens of each of the computers in the pictures.


Computers can do different things.
You can type words on a computer.
You can watch videos and listen to sounds.
You can make pictures.
You can play games.
14

Ask students the following questions:

LITERAL—What are some different things you can do on a computer?

» You can make pictures, play games, or watch videos.

EVALUATIVE—What do you think is the best way to use computers?

» Students' answers will vary.

Page 15

Ask students to look at the pictures on page 15. Talk about what they notice about the printer and what it is doing.

Words and pictures are information.
You can save your information on a computer.

You can send information to another computer.

You can print information on paper.

15

Ask students the following questions:

LITERAL—What is information?

» Words and pictures are information.

EVALUATIVE—How can you share information with a computer?

» You can print information from a computer or even send it to another computer.

3. Check for understanding.

Unplugged Activity

Draw or display an outline of a desktop computer. Ask students to label the parts of the computer with precut words: *screen*, *monitor*, *speakers*, *mouse*, *keyboard*, *processor*, and *camera*. Ask a student to draw a place for the computer to be (guide students in recognizing that a table or desk for it to be sitting on should be drawn).

CHALLENGE—Print off a smaller version of the enlarged desktop computer, and have students label the computer individually.

LESSON 2, PART 2

A Closer Look at Computers

Driving Question: What are computers, and where can we find them?

Overarching Unit Objective: Identify computer devices and parts, and operate them age-appropriately.

At a Glance

Learning Objectives

- ✓ Recognize that a computer is an electronic device that can receive input to do tasks.
- ✓ Name common activities that can be done on a desktop computer.
- ✓ Identify basic components of a desktop computer.

Instructional Activities

- whole-class discussion
- guided activity

CSTA Standards

Concept: Computing Systems

Subconcept and Standard: Hardware and Software: 1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).

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desktop computer **keyboard** **monitor** **mouse**

Language of Instruction consists of additional terms that you should use when talking about concepts in the lesson. Students benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves.

camera	**headphones**	**printer**	**processor**
speakers	**system**		

Materials and Equipment

Collect or prepare the following:

- colored pencils, crayons, or markers
- desktop computer or image of desktop computer

Activity Page

A.P. 2.2

Activity Page 2.2

Parts of a Computer (A.P. 2.2)

Advance Preparation

- Make sufficient copies of AP 1.2 for all students in the class.

The Core Lesson

1. Focus attention on today's topic.

If a desktop computer is available in the classroom or the library, gather students around it, and lead a class discussion there. If a desktop computer is not available, show an image of one in a book or printed from the internet.

Ask students: Why is this called a desktop computer? Is it an electronic device? Can information be entered into it?

Prompt students to discuss the types of activities computers can be used for. Encourage responses such as typing words, drawing pictures, playing games, watching videos, listening to music, printing pages, and connecting with others.

Ask students if they can name any parts of the desktop computer that they can see. Ask them if they can name any parts of it that cannot be seen.

2. Facilitate the activity.

Activity Page

AP 2.2

1. Pass out Activity Page 2.2 to each student.
2. Instruct students to gather one marker, crayon, or colored pencil of each of the colors red, yellow, purple, blue, and green.
3. Read the following prompts to students:
   - Color the part that processes information yellow. (processor)
   - Color the part that can input letters and words blue. (keyboard)

- Color the part that can input clicks and drags purple. (mouse)
- Color the part that can take photos green. (camera)
- Color the part that is around the screen red but leave the screen blank. (monitor)

3. Check for understanding.

Unplugged Activity

Ask students to hold up their Activity Pages to view if they have colored the computer components correctly. Discuss any areas of misunderstanding.

Prompt students to draw an activity they like to do or would like to do on a desktop computer within the blank monitor screen on their Activity Page.

EXTEND—Extend the lesson and student writing skills by having them write the desktop computer components on sticky notes. They can take turns placing the correct note on each component of the classroom or library desktop computer.

CHALLENGE—Challenge students to create a matching game, with one card being a name of the component, and the other card being a description of the job of the component.

Know the Standards

1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware). When communicating about computing devices, it is important to describe basic hardware and software components with accurate terminology. Hardware components of a computer system can include desktop computers, laptop computers, CPUs, tablet devices, monitors, keyboards, mice, speakers, and printers. A wide variety of software applications can be used to perform tasks based on the needs of the user. Common software types include word processors, spreadsheets, presentation programs, databases, drawing programs, social media, and web browsers.

LESSON 3, PART 1

Laptops

Driving Question: What are computers, and where can we find them?

Overarching Unit Objective: Identify computer devices and parts, and operate them age-appropriately.

At a Glance

Learning Objective

✓ Recognize laptop or notebook computers and their similarities to desktop computers.

Instructional Activities

- teacher Read Aloud
- whole-class discussion

CSTA Standards

Concept: Computing Systems

Subconcept and Standard: Devices: 1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. (P1.1)

For detailed information about the CSTA Standards, follow the links in the Online Resources Guide for this unit:

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laptop

Language of Instruction consists of additional terms that you should use when talking about concepts in the lesson. Students benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves.

app **icon** **notebook** **screen** **trackpad**

Instructional Resource

Student Book

Ch. 3

Student Book, Chapter 3
Laptops

Materials and Equipment

Collect or prepare the following:

- internet access and the means to project images/video for whole-class viewing
- printout or display of local restaurant/store icons (no words, just the symbols)
- printout or display of commonly used apps

The Core Lesson

1. Focus attention on today's topic.

Show students, one at a time, pictures of store or restaurant icons, and ask them what store or restaurant it is. Ask students: how do you know the names of the places without having words to identify them? Tell students that these icons are used to make it easier for people to remember the store or restaurant.

2. Read together "Laptops."

Student Book

Ch. 3

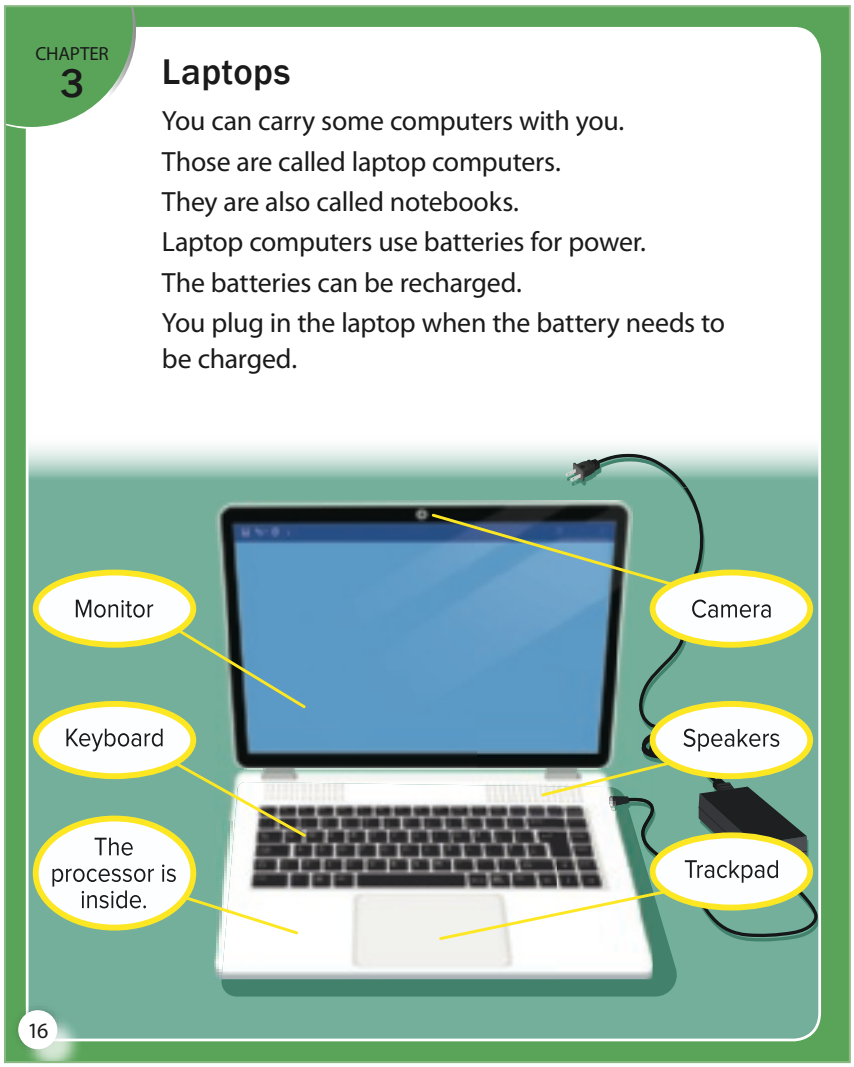
While some students may be able to read words on a given page of the Student Book, as a general rule students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

Read Aloud Support

Ask students to turn to page 16 of the Student Book and look at the image as you read aloud. Remind them that the title of this chapter is "Laptops," and tell them to pay special attention to how laptop computers look different from desktop computers as you read.

Page 16

Ask students to look at the picture on page 16. Talk about what they notice about how laptops are different from desktop computers.



Ask students the following questions:

LITERAL—What are some parts of a laptop?

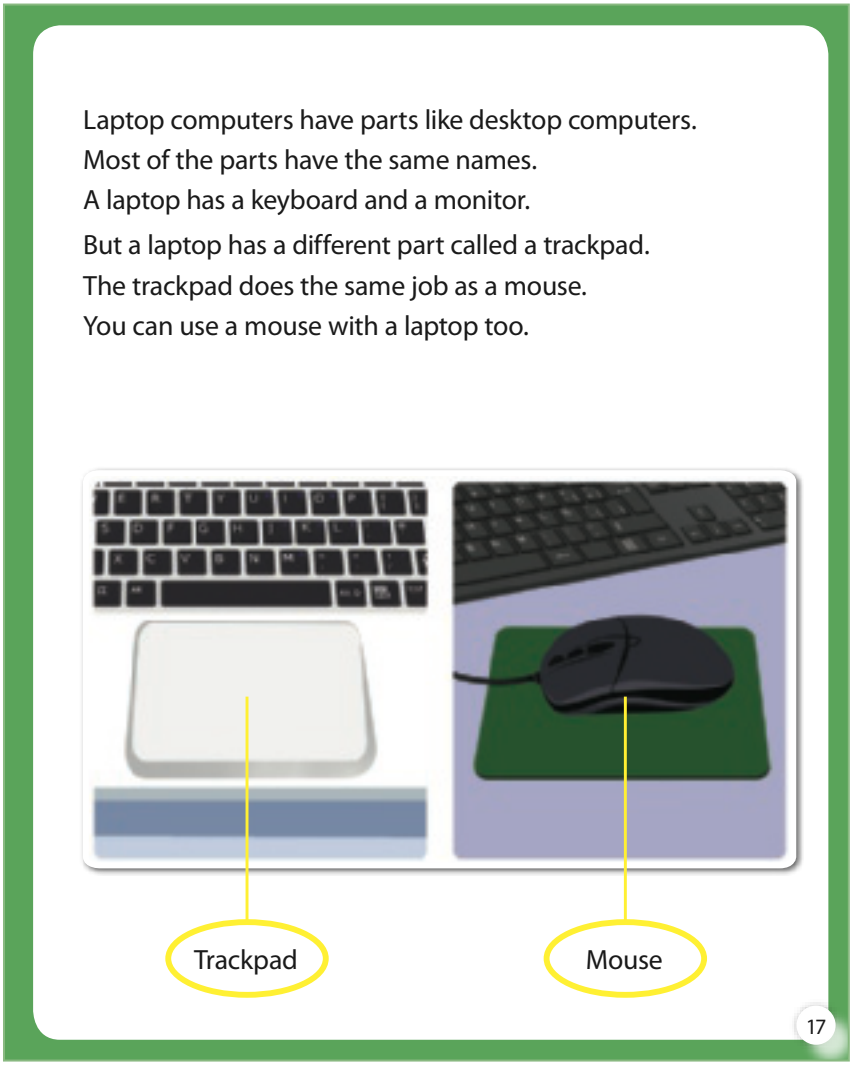
» Some parts of a laptop are the keyboard, screen, and trackpad.

EVALUATIVE—How are laptop and desktop computer parts alike or different?

» They have some parts that are similar, like the screen and keyboard, but laptops have some different parts from desktops, like the battery and trackpad for the mouse.

Page 17

Ask students to look at the pictures on page 17. Explain that the pictures show two different parts – one is from a desktop computer, and the other from a laptop computer.


Laptop computers have parts like desktop computers.
Most of the parts have the same names.
A laptop has a keyboard and a monitor.
But a laptop has a different part called a trackpad.
The trackpad does the same job as a mouse.
You can use a mouse with a laptop too.
Trackpad
Mouse
17

Ask students the following questions:

LITERAL—What are the two parts that are shown in the picture?

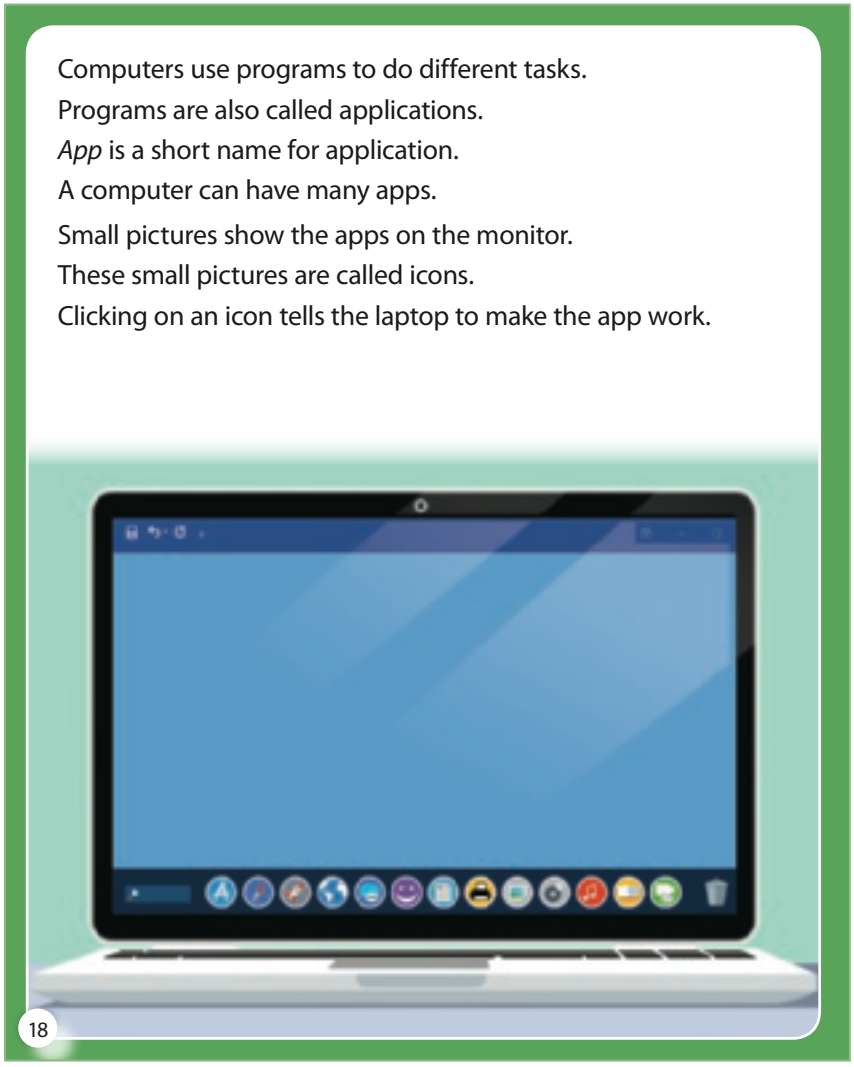
» A trackpad and mouse.

EVALUATIVE—How is a laptop the same as a desktop computer? How is it different?

» They are the same because they both have monitors and keyboards. They are different because a laptop uses a trackpad or mouse and a desktop computer only uses a mouse.

Page 18

Ask students to look at the picture on page 18. Explain that it shows different pictures called icons, and that these icons represent programs that you can use on a laptop.


Computers use programs to do different tasks.
Programs are also called applications.
App is a short name for application.
A computer can have many apps.
Small pictures show the apps on the monitor.
These small pictures are called icons.
Clicking on an icon tells the laptop to make the app work.
18

Ask students the following questions:

LITERAL—What is an app?

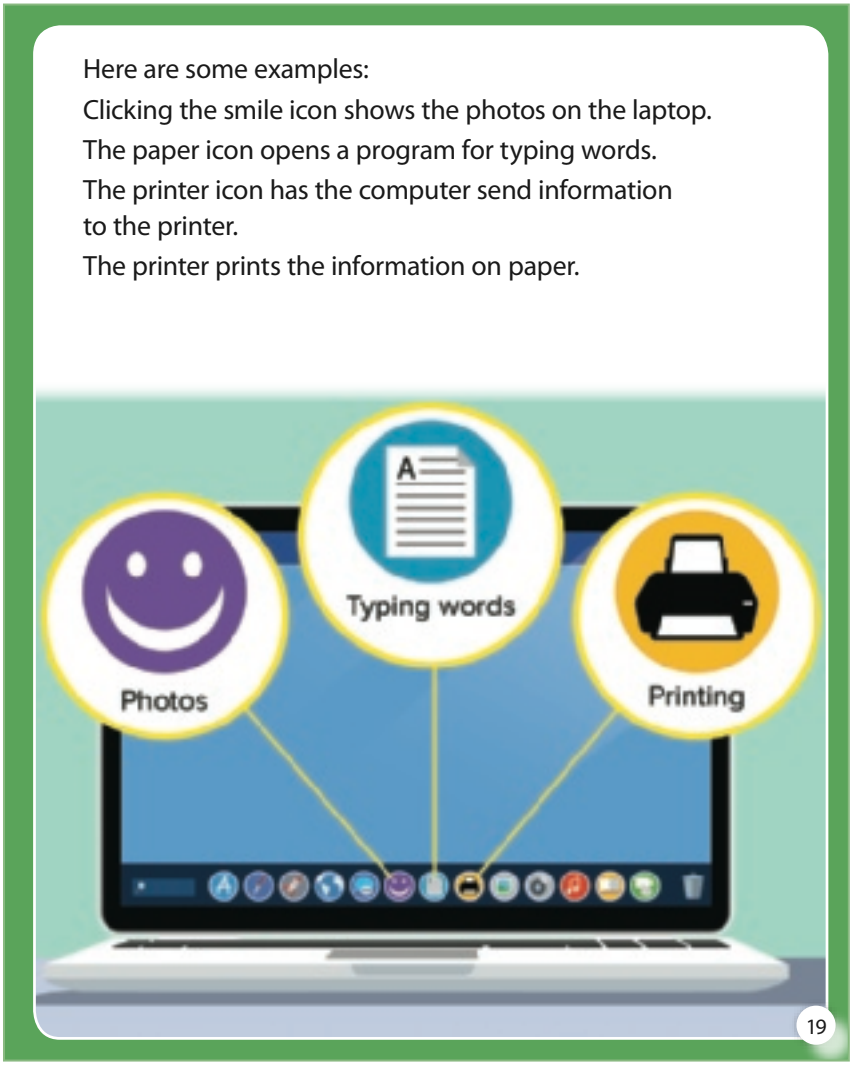
» An app is a short name for application, and it is a computer program.

LITERAL—What is an icon, and what does it do?

» An icon is a small picture that you can click on that tells the laptop to make the app work.

Page 19

Ask students to look at the picture on page 19 as you read aloud. Discuss how the different pictures stand for different apps. Usually the picture is a hint for what the program does.


Here are some examples:
Clicking the smile icon shows the photos on the laptop.
The paper icon opens a program for typing words.
The printer icon has the computer send information to the printer.
The printer prints the information on paper.
Photos
Typing words
Printing
19

Ask students the following questions:

LITERAL—What does the printer icon do?

» It makes the laptop send information to the printer.

LITERAL—What does the smile icon do?

» It shows the photos on the laptop.

3. Check for understanding.

Unplugged Activity

Display some apps on a screen, or have them printed out on paper. Then have students come up to sort the apps according to what they are intended to be used for.

EXTEND—For students who enjoy the idea of apps, ask them to think of a new icon for an already-used app. For example, instead of a smiley icon face icon for the photos app, perhaps they will think of a camera for a new icon to activate the same app. Have them draw their new icon.

LESSON 3, PART 2

How Is a Laptop Different from a Desktop Computer?

Driving Question: What are computers, and where can we find them?

Overarching Unit Objective: Identify computer devices and parts, and operate them age-appropriately.

At a Glance

Learning Objectives

- ✓ Explain how a laptop computer can be portable.
- ✓ Identify icons that are symbols for computer components and apps.

Instructional Activities

- whole-class discussion
- guided group activity
- pairs activity

CSTA Standards

Concept: Computing Systems

Subconcepts and Standards:

Hardware and Software: 1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. (P1.1)

Devices: 1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).

For detailed information about the CSTA Standards, follow the links in the Online Resources Guide for this unit:

www.coreknowledge.org/cksci-online-resources

Core Vocabulary and Language of Instruction

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laptop **rechargeable** **trackpad**

Language of Instruction consists of additional terms that you should use when talking about concepts in the lesson. Students benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves.

app	**components**	**icon**	**notebook**
portable	**software**	**stationary**	

Materials and Equipment

Collect or prepare the following:

- laptop computer for demonstration or an image of a laptop computer

Activity Page

A.P. 3.2

Activity Page 3.2

Laptops (AP 3.2)

Advance Preparation

- Make sufficient copies of AP 3.2

The Core Lesson

1. Focus attention on today's topic.

Ask students why they would not take a desktop computer on vacation with them. Discuss how a desktop computer is stationary—it is not meant to move—but a laptop computer is portable. Demonstrate with a physical laptop computer or an image if one is not available. A laptop is smaller in size and weight and can be moved around easily in a bag.

Ask students how a laptop computer gets power if it is moved around. Describe a rechargeable battery. It is a battery that charges when the computer is plugged in, but the cord can be unplugged when the battery is charged so that the computer again becomes portable.

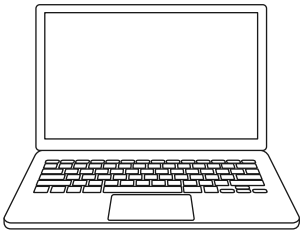
Ask students if the same parts that are in a desktop computer also exist in or can be used with a laptop.

2. Facilitate the activity.

Activity Page

AP 3.2

1. Pass out Activity Page 3.2 to each student.
2. Read the following prompts to students:
   - Copy the word *Processor* from the desktop computer to the appropriate place on the laptop.
   - Copy the word *Screen* from the desktop computer to the appropriate place on the laptop.



Unplugged Activity

- Copy the word *Keyboard* from the desktop computer to the appropriate place on the laptop.
- Copy the word *Camera* from the desktop computer to the appropriate place on the laptop.
- Plug in the laptop computer to charge the batteries by drawing a power cord from the laptop to the wall outlet.

3. Ask students how they were able to know where to plug in the laptop.

3. Check for understanding.

Unplugged Activity

Students pair up to compare their Activity Pages and discuss any differences between them. Student pairs should discuss the labels, as well as the power supply, and make any needed corrections to their diagrams.

EXTEND—Extend the lesson by asking students to color-code the components (as they did in Lesson 2.2) on both the desktop and laptop computer images.

Know the Standards

1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. People use computing devices to perform a variety of tasks accurately and quickly. Students should be able to select the appropriate app/program to use for tasks they are required to complete. For example, if students are asked to draw a picture, they should be able to open and use a drawing app/program to complete this task, or if they are asked to create a presentation, they should be able to open and use presentation software.

1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware). When communicating about computing devices, it is important to describe basic hardware and software components with accurate terminology. Hardware components of a computer system can include desktop computers, laptop computers, CPUS, tablet devices, monitors, keyboards, mice, speakers, and printers. A wide variety of software applications can be used to perform tasks based on the needs of the user. Common software types include word processors, spreadsheets, presentation programs, databases, drawing programs, social media, and web browsers.

LESSON 4, PART 1

Tablets

Driving Question: What are computers, and where can we find them?

Overarching Unit Objective: Identify computer devices and parts, and operate them age-appropriately.

At a Glance

Learning Objective

✓ Recognize tablet devices as computers.

Instructional Activities

- teacher Read Aloud
- whole-class discussion

CSTA Standards

Concept: Computing Systems

Subconcept and Standard: Devices: 1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. (P1.1)

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internet **online** **tablet** **touchscreen**

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app **icon** **screen** **scroll** **type**

Instructional Resource

Student Book

Ch. 4

Student Book, Chapter 4
Tablets

Materials and Equipment

Collect or prepare the following:

- internet access and the means to project images/video for whole-class viewing
- tablet device if available, or a printed or on-screen image of a tablet

The Core Lesson

1. Focus attention on today's topic.

Show students a tablet, and ask them to tell you about the device. Prompt them with the following questions as needed:

"What is this called?" "What makes it power on?" "How long does the power last?" "What can you use it for?"

2. Read together "Tablets."

Student Book

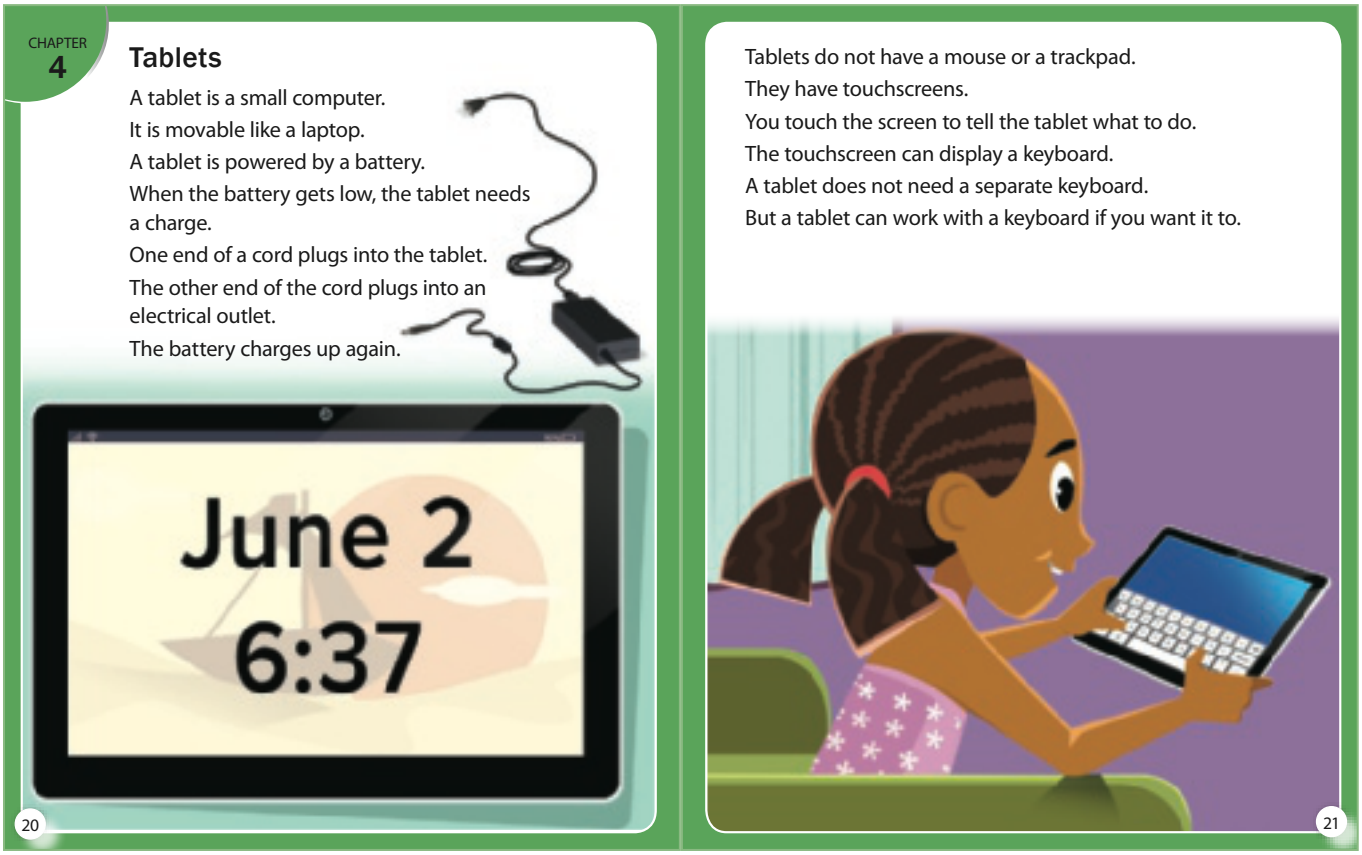
Ch. 4

While some students may be able to read words on a given page of the Student Book, students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

Read Aloud Support

Ask students to turn to pages 20 and 21 of the Student Book and look at the images as you read aloud. Remind them that the title of this chapter is "Tablets," and tell them to pay special attention to the different uses the pictures show of tablets as you read.

Pages 20–21 **Ask students to look at the pictures on pages 20 and 21.** Talk about what they notice about the size of and accessories that go along with a tablet.


CHAPTER 4
Tablets
A tablet is a small computer.
It is movable like a laptop.
A tablet is powered by a battery.
When the battery gets low, the tablet needs a charge.
One end of a cord plugs into the tablet.
The other end of the cord plugs into an electrical outlet.
The battery charges up again.
June 2
6:37
20
Tablets do not have a mouse or a trackpad.
They have touchscreens.
You touch the screen to tell the tablet what to do.
The touchscreen can display a keyboard.
A tablet does not need a separate keyboard.
But a tablet can work with a keyboard if you want it to.
21

Ask students the following questions:

INFERENTIAL—Why do tablets not have a trackpad or a mouse?

» They use a touchscreen.

INFERENTIAL—How is a tablet different from a computer?

» Tablets have touchscreens that you touch to tell the tablet what to do. They also don't use keyboards in the same way as a computer—keyboards can attach, but they don't have to.

Page 22

Ask students to look at the picture on page 22. Explain that it shows some icons that they may be familiar with. Ask students: do you know what these icons mean?

You can play games on a tablet.
Most tablets have a camera so you can take pictures.
You can listen to music on a tablet.
You can watch videos.
You can also type and send messages from a tablet.
Desktop computers, laptops, and tablets all use apps.
There are many kinds of apps.
22

Ask students the following questions:

LITERAL—What are some things you can use a tablet for?

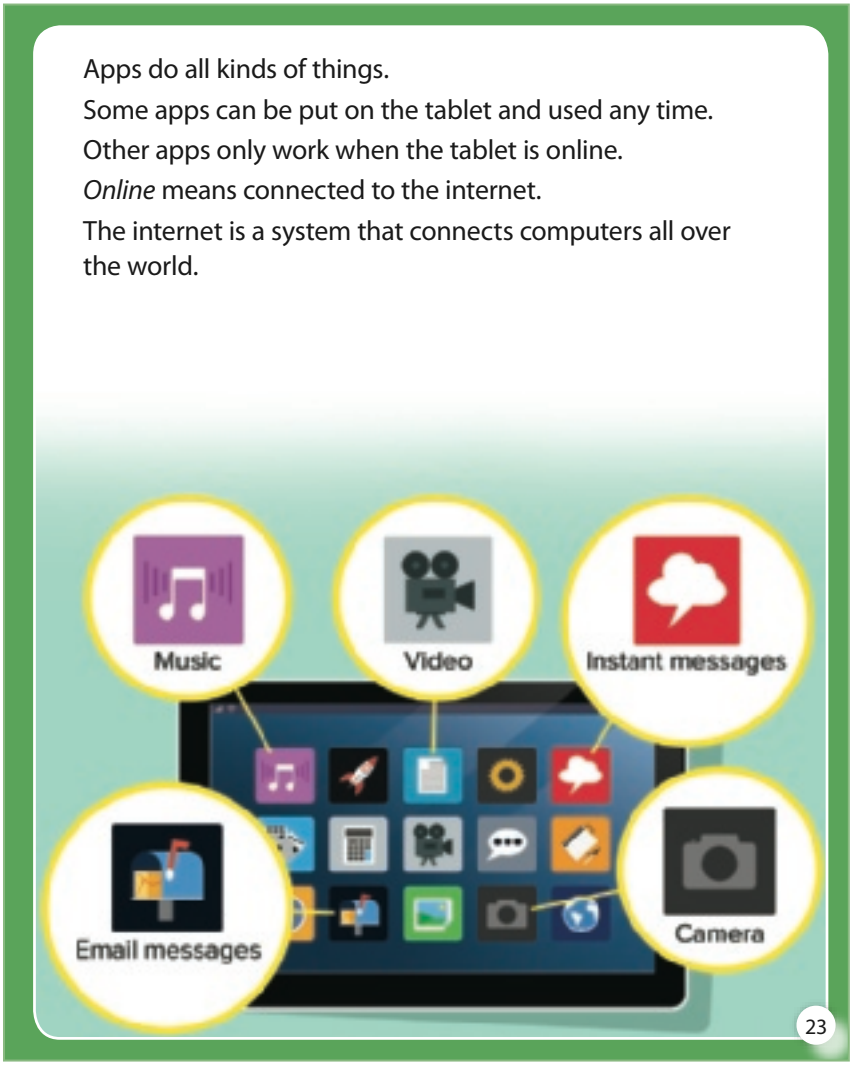
» Some things you can use a tablet for are playing games, taking pictures, listening to music, watching videos, or typing and sending messages.

EVALUATIVE—Is it easier to play games on a tablet or on a computer?

» Student answers will vary.

Page 23

Ask students to look at the picture on page 23 as you read aloud. Discuss with students and remind them of the concept of apps. Apps are applications that you may use to access things like photos or email.


Apps do all kinds of things.
Some apps can be put on the tablet and used any time.
Other apps only work when the tablet is online.
Online means connected to the internet.
The internet is a system that connects computers all over the world.
Music
Video
Instant messages
Email messages
Camera
23

Ask students the following questions:

LITERAL—What is the internet?

» The internet is a system that connects computers all over the world.

INFERENTIAL—What do you need to use the apps on a tablet?

» At times, you need the internet in order to use some apps. Other times, you can use some apps without being connected to the internet.

3. Check for understanding.

Unplugged Activity

Draw a left hand on the left side of the board next to a tablet. Draw a right hand on the right side of the board next to a laptop. Have students raise their left hands, right hands, or both hands as you ask if the devices have these features:

Keyboard *(laptop; Students should raise right hands)*

Screen *(both; Students should raise both hands)*

Touchscreen *(tablet; Students should raise left hands)*

Uses apps *(both; Students should raise both hands)*

> **EXTEND**—For students who show an interest, you might have them think of an app that they could create on their own. Students will not actually create an app, but rather just come up with an idea for one (for example, perhaps they think of a monkey game for adding and subtracting). Then have them draw a picture of the icon they might use for the app.

LESSON 4, PART 2

Apps on a Tablet

Driving Question: What are computers, and where can we find them?

Overarching Unit Objective: Identify computer devices and parts, and operate them age-appropriately.

At a Glance

Learning Objectives

- ✓ Describe how an app is selected on a tablet that does not have a keyboard or a mouse.
- ✓ Explain how icons or symbols can represent an app and other computer functions.

Instructional Activities

- whole-class discussion
- independent activity
- class activity

CSTA Standards

Concepts:

- Computer Systems
- Algorithms and Programming

Subconcepts and Standards:

Devices: 1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use.

Variables: 1A-AP-09 Model the way programs store and manipulate data by using numbers or other symbols to represent information.

For detailed information about the CSTA Standards, follow the links in the Online Resources Guide for this unit:

www.coreknowledge.org/cksci-online-resources

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app **icon** **tablet** **touchscreen**

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portable **represent** **symbol**

Materials and Equipment

Collect or prepare the following:

- whiteboard
- blank sheet of paper for each student
- tablet device if available, or a printed or on-screen image of a tablet

Advance Preparation

- Clear the whiteboard so that the maximum amount of space is available for a drawing by each student.
- Optional: Draw a frame around the edges of the whiteboard to symbolize it now being a tablet.
- Draw a power button icon somewhere on the classroom tablet.

The Core Lesson

1. Focus attention on today's topic.

How do you open apps on a tablet? Ask students if they have ever used a tablet and what makes it different from a desktop computer or a laptop computer. Guide their discussion with items such as; no required keyboard, no mouse or trackpad for input, being even smaller/more portable, being battery powered, etc. Ask the students how they tell a tablet what they want to do or play—by touching the icons). If a tablet is available, show the apps on the touchscreen, and ask students what activity they think the apps represent. Demonstrate opening a few different apps, such as a game, a messaging tool, a drawing program, a camera, and a music player.

2. Facilitate the activity.

Unplugged Activity

1. Pass out a blank sheet of paper to each student. Tell the students they are each going to design and describe an app for the classroom tablet.
2. Instruct them to quietly think of the type of app most personally enjoyable on a tablet. Each of them should be able to describe their app to others.
3. They each use the entire sheet of paper to draw a large icon that represents their preferred app. Tell them to not show it to anyone, and to not put their name on it.
4. When the students are finished, collect all the papers. Ideally when the class is out of the room, use tape to secure the papers in a grid onto the whiteboard. This is now the "classroom tablet."
5. When the students return, they should sit in their seats and put their heads down.
6. "Press" the power icon on the board, and tell them the classroom tablet is powering up, so they can raise their heads and be ready.

7. Guide a student to stand up and tell the class what their app does.
8. That student sits down. Select apps until all of the students have had a turn.
9. When you are ready to finish the activity, press the power button again. The students then should "shut down" by putting their heads back down.

3. Check for understanding.

Unplugged Activity

Ask students to describe what icon to look for in order to open a favorite game. What about a video player? What about a math or a reading tool for school?

Know the Standards

1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. People use computing devices to perform a variety of tasks accurately and quickly. Students should be able to select the appropriate app/program to use for tasks they are required to complete. For example, if students are asked to draw a picture, they should be able to open and use a drawing app/program to complete this task, or if they are asked to create a presentation, they should be able to open and use presentation software. In addition, with teacher guidance, students should compare and discuss preferences for software with the same primary function. Students could consider different web browsers or word processing, presentation, or drawing programs.

1A-AP-09 Model the way programs store and manipulate data by using numbers or other symbols to represent information. Information can be represented in computer programs. Students could use thumbs up/down as representations of yes/no, use arrows when writing algorithms to represent directions, or encode and decode words using numbers, pictographs, or other symbols to represent letters or words.

LESSON 5, PART 1

Smartphones

At a Glance

Learning Objective

✓ Recognize a smart phone, and categorize it as a computer device.

Instructional Activities

- teacher Read Aloud
- whole-class discussion

CSTA Standards

Concept: Computing Systems

Subconcept and Standard: Devices: 1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. (P1.1)

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smartphone **type** **video**

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tablet **touchscreen** **voice call**

Instructional Resource

Student Book

Ch. 5

Student Book, Chapter 5
Smartphones

Materials and Equipment

Collect or prepare the following:

- internet access and the means to project images/video for whole-class viewing
- premade display of several different types of phones (including smartphones and phones that are not smartphones, and a landline phone)

The Core Lesson

1. Focus attention on today's topic.

Give students the following scenario, and ask them what you could do:

"I am at the beach and realize I forgot sunscreen. My friend is coming soon. She could bring me sunscreen if I asked her. How can I get in touch with her to ask her to bring me sunscreen?"

2. Read together "Smartphones."

Student Book

Ch. 5

While some students may be able to read words on a given page of the Student Book, students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

Read Aloud Support

Ask students to turn to page 24 of the Student Book and look at the image as you read aloud. Remind them that the title of this chapter is "Smartphones," and tell them to pay special attention to how people use smartphones as you read.

Page 24

Ask students to look at the picture on page 24. Talk about what they notice on the smartphone in the picture.

CHAPTER 5

Smartphones

Cell phones are mobile devices.
Mobile means they can be carried around easily.
Cell phones that can do computer tasks are called smartphones.
Smartphones are smaller than tablets.
Most of them can fit in a pocket.
They can work almost anywhere.
Smartphones get power from batteries.
Plugging in the phone charges the battery.

24

Ask students the following questions:

LITERAL—What are smartphones?

» Smartphones are mobile devices.

LITERAL—How do smartphones get their power?

» They get their power from batteries.

Page 25

Ask students to look at the picture on page 25. Explain that it shows how people can talk to their family even if they are not in the same room.

You can call people on a smartphone.
They can call you too.
You can hear each other's voices.
You can also have video calls.
Then you can see each other while talking.
The person you talk to on a smartphone can be very far away.
25

Ask students the following questions:

INFERENTIAL—Does the person you call have to be close by?

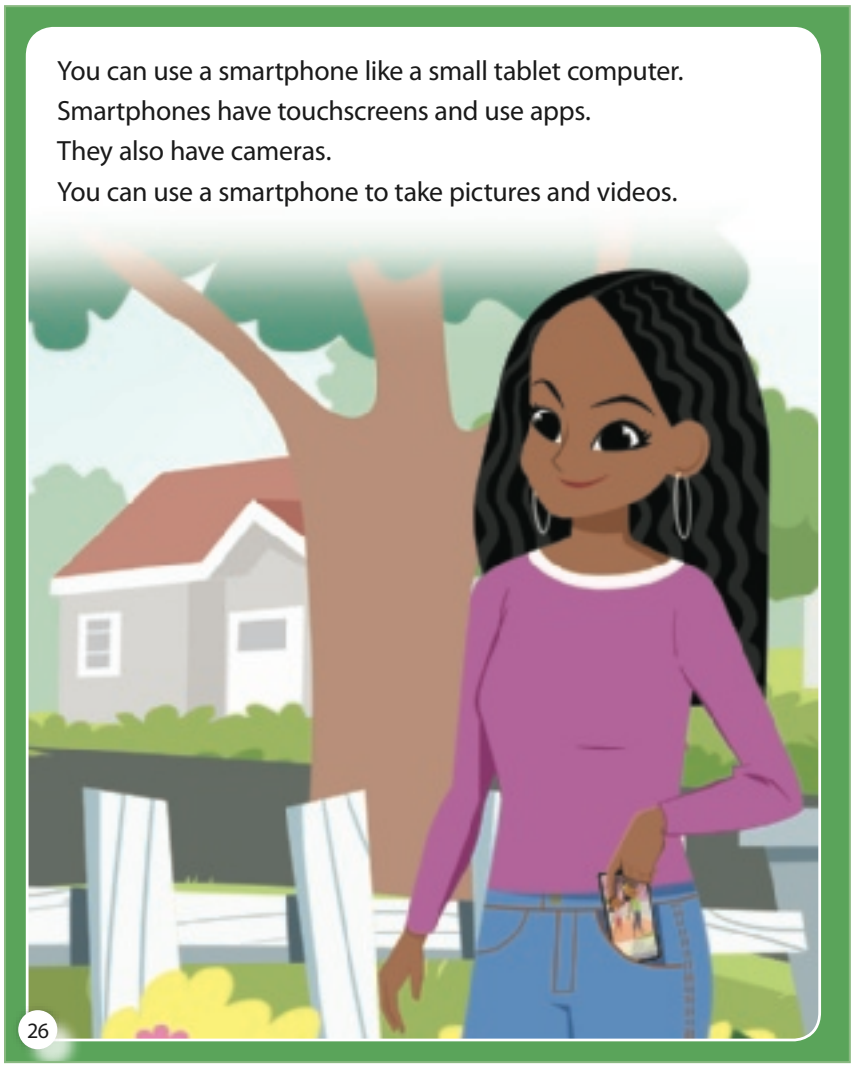
» No, they can be very far away.

INFERENTIAL—What kind of phone calls can you make using a smartphone?

» You can call people using a smartphone and hear their voices, or you can have video calls using a smartphone and see them while you talk.

Page 26

Ask students to look at the picture on page 26 as you read aloud. Discuss how smartphones have many different features.


You can use a smartphone like a small tablet computer.
Smartphones have touchscreens and use apps.
They also have cameras.
You can use a smartphone to take pictures and videos.
26

Ask students the following questions:

LITERAL—What features do smartphones have?

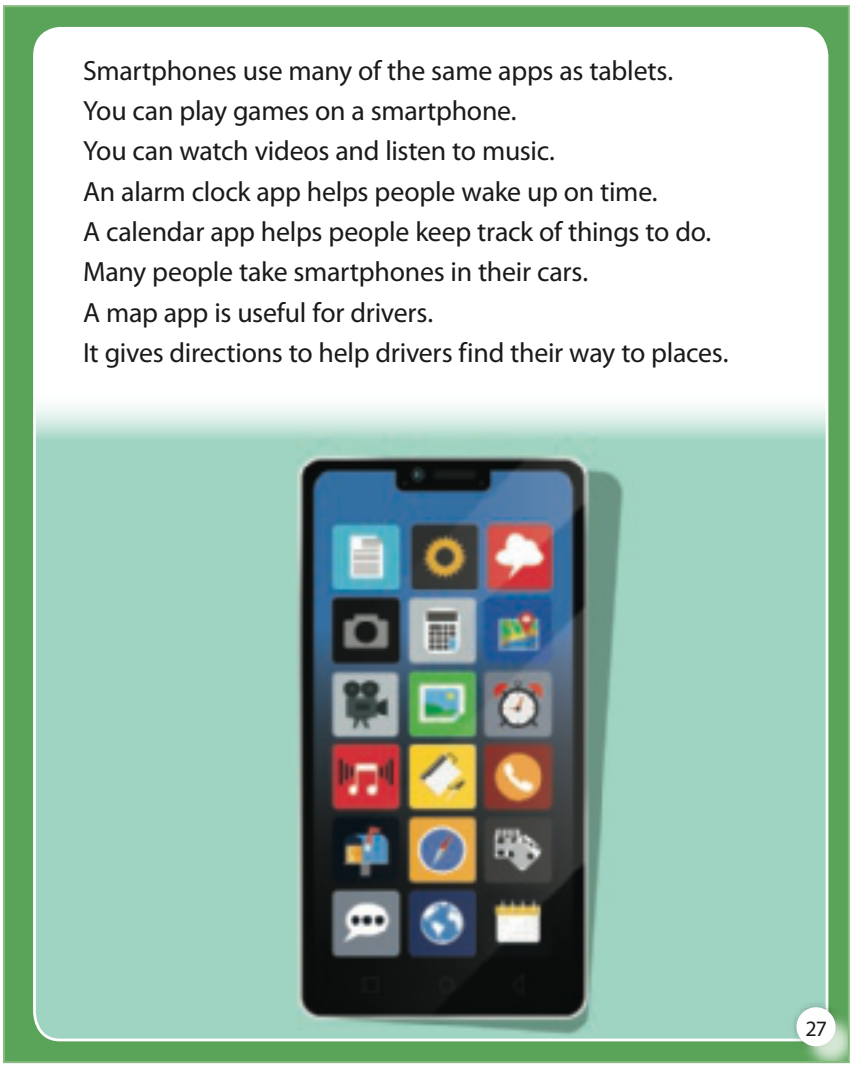
» Smartphones have touchscreens, apps, and cameras.

EVALUATIVE—What do you think is the best way to use smartphones?

» Student answers will vary.

Page 27

Ask students to look at the picture on page 27. Talk about what they notice about the icons on the smartphone and what the icons mean.


Smartphones use many of the same apps as tablets.
You can play games on a smartphone.
You can watch videos and listen to music.
An alarm clock app helps people wake up on time.
A calendar app helps people keep track of things to do.
Many people take smartphones in their cars.
A map app is useful for drivers.
It gives directions to help drivers find their way to places.
27

Ask students the following questions:

LITERAL—Tell me about some apps smartphones have and how they are used.

» Some apps smartphones have include an alarm clock to help people wake up on time, a calendar to keep track of things, and a map that helps drivers.

EVALUATIVE—How are smartphones and tablets alike?

» Smartphones and tablets are similar because you can play games, watch videos, and listen to music on both.

3. Check for understanding.

Unplugged Activity

Display a few pictures of different types of phones digitally or on chart paper (include smartphones and landline phones). Ask students to identify the smartphones in the pictures.

EXTEND—For students who may be interested, you can talk about the different variations of smartphones. You might show them different brands of smartphones and talk about the features they have and don't have in common.

LESSON 5, PART 2

What Can a Smartphone Do?

At a Glance

Learning Objectives

- ✓ Explain how a smartphone is similar to and different from tablets and computers.
- ✓ Describe how a smartphone replaces so many previous technology tools all in one portable device.

Instructional Activities

- whole-class discussion
- small group activity

CSTA Standards

Concepts:

- Computer Systems
- Impacts of Computing

Subconcepts and Standards:

Devices: 1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use.

Culture: 1A-IC-16 Compare how people live and work before and after the implementation or adoption of new computing technology.

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app **icon** **smartphone** **telephone** **touchscreen**

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advancement **replacement**

Materials and Equipment

Collect or prepare the following:

- scissors
- paper clips
- phone with buttons and/or an even older phone with a rotary dial

Activity Page

AP 5.2

Activity Page 5.2

Old Devices, New Apps (AP 5.2)

Advance Preparation

- Make sufficient copies of AP 5.2 for student groups.
- Cut out the pieces from each Activity Page, and paper clip the set together.

The Core Lesson

1. Focus attention on today's topic.

Ask students to describe a smartphone and how it is different from a computer (size, portability) and similar to a tablet (touchscreen, apps, portability, rechargeable battery). Explain that a smartphone is like a combination of a phone and computer that can work anywhere. Ask students if they have ever seen an older kind of phone and, if so, to describe it. Did it have buttons you pressed or perhaps even a dial? Did it have a long cord attached to the wall? Demonstrate with a classroom or an older phone if possible. Ask if someone could put one of those phones in a pocket or a purse like a smartphone. Can someone take pictures with an old-style phone?

2. Facilitate the activity.

Activity Page

AP 5.2

1. Place students into groups of three or four.
2. Pass out a stack of Activity Page 5.2 cut-out pieces to each group.
3. Instruct students to keep the pieces facedown and to place them in a grid. Tell them their group is going to play a game of concentration by matching a previous technology tool with a smartphone app.
4. Students take turns turning over two pieces and trying to make a match. If no match is made, the cards are turned back over, and the play moves to the next student.

5. If a match is made, the student tells the group what technology is matched. The student removes the pieces and keeps them in a pile nearby. The student can then take another turn.
6. The game ends when all of the pieces are matched.

3. Check for understanding.

Unplugged Activity

Ask students why *smartphone* is a good name for an internet-connected mobile phone device. *(People can use smartphones to do many things: make calls, use maps, play games, watch movies, send messages, play music, set an alarm clock, etc.)*

Ask them how to tell a smartphone what to do. *(They touch icons to open apps just like on a tablet.)*

Know the Standards

1A-CS-01 Select and operate appropriate software to perform a variety of tasks and recognize that users have different needs and preferences for the technology they use. People use computing devices to perform a variety of tasks accurately and quickly. Students should be able to select the appropriate app/program to use for tasks they are required to complete. For example, if students are asked to draw a picture, they should be able to open and use a drawing app/program to complete this task, or if they are asked to create a presentation, they should be able to open and use presentation software. In addition, with teacher guidance, students should compare and discuss preferences for software with the same primary functionality. Students could compare different web browsers or word processing, presentation, or drawing programs.

1A-IC-16 Compare how people live and work before and after the implementation or adoption of new computing technology. Computing technology has positively and negatively changed the way people live and work. In the past, if students wanted to read about a topic, they needed access to a library to find a book about it. Today, students can view and read information on the internet about a topic, or they can download e-books about it directly to a device. Such information may be available in more than one language and could be read to a student, allowing for great accessibility.

LESSON 6, PART 1

Connected Computers

Driving Question: What are computers, and where can we find them?

Overarching Unit Objective: Identify computer devices and parts, and operate them age-appropriately.

At a Glance

Learning Objective

✓ Recognize that one computer device can send information to another.

Instructional Activities

- teacher Read Aloud
- whole-class discussion

CSTA Standards

Concept: Computing Systems

Subconcept and Standard: Devices: 1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. (P1.1)

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computer

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email **internet** **network** **password** **private**

Instructional Resource

Student Book

Ch. 6

Student Book, Chapter 6
Connected Computers

Materials and Equipment

Collect or prepare the following:

- internet access and the means to project images/video for whole-class viewing
- computer with email application for demonstration
- poster paper

The Core Lesson

1. Focus attention on today's topic.

Prepare a simple email that you want to send to someone in your building, or to someone whom your class knows. Display the email for students to see, and send it. Then ask students: how does the email get to the intended person?

2. Read together "Connected Computers."

Student Book

Ch. 6

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Read Aloud Support

Ask students to turn to page 28 of the Student Book and look at the image as you read aloud. Remind them that the title of this chapter is "Connected Computers," and tell them to pay special attention to how the internet helps people communicate as you read.

Page 28

Ask students to look at the picture on page 28. Talk about what they notice about the way people are connecting or interacting with one another.

CHAPTER 6

Connected Computers

Computer devices can share information.
To do this, they need to be connected.
Connected devices are part of a network.

The internet is a giant network.
It connects computers all over the world.
Desktop computers can connect to the internet.
So can laptops, tablets, and smart phones.

28

Ask students the following questions:

LITERAL—What devices can connect to the internet?

» Desktop computers, laptops, tablets, and smartphones can connect to the internet.

LITERAL—How can computer devices share information?

» They use a connection called a network.

Page 29

Ask students to look at the picture on page 29. Explain that Hanna and her grandma live far away from each other, but that they are still able to communicate.

Hanna wants to send her grandma an email.
Email means "electronic mail."
She types her message on the computer.
She uses the internet to send it.
Her grandma's computer is connected to the internet too.
This way she can receive the email.

29

Ask students the following questions:

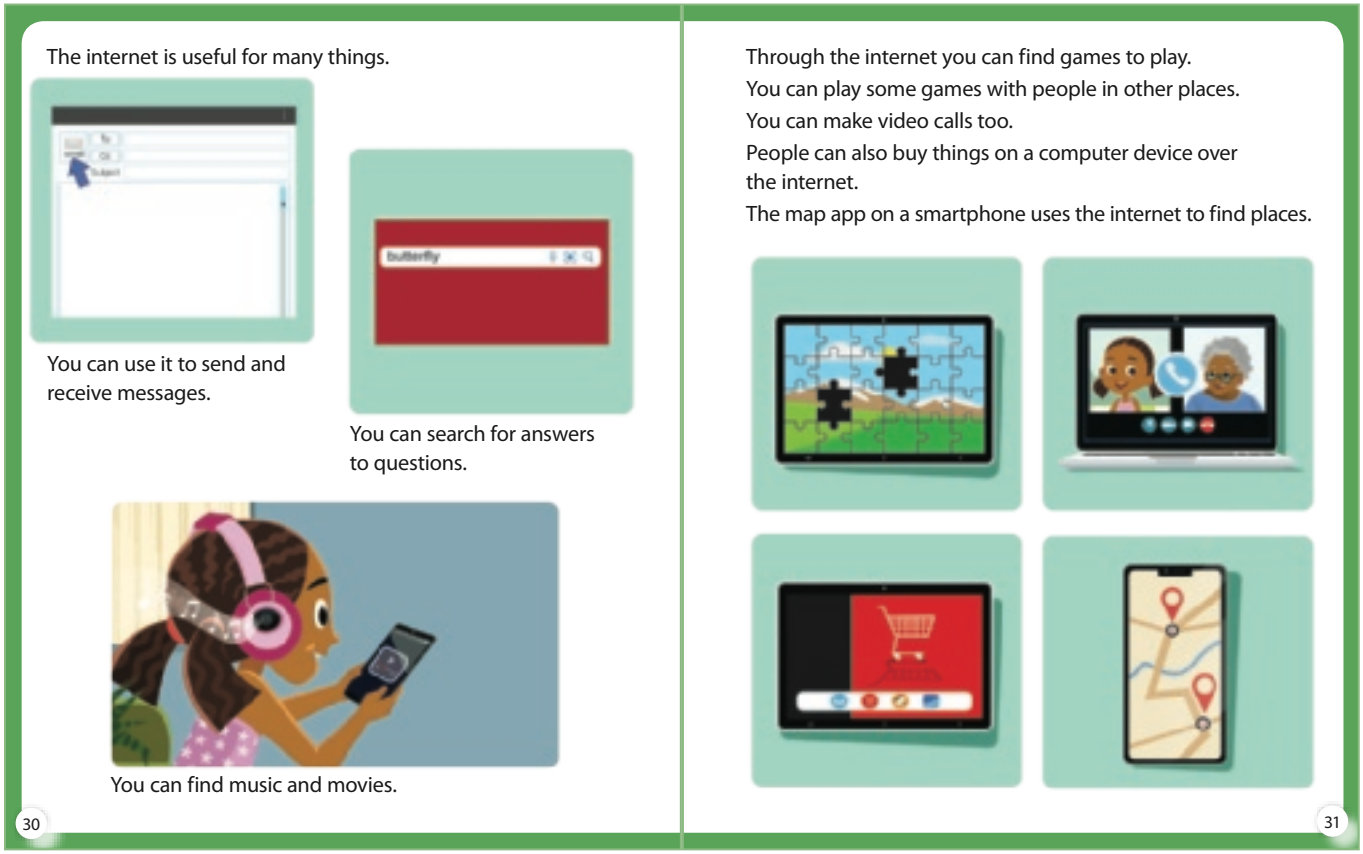
INFERENTIAL—How does Hanna communicate with her grandma?

» Hanna types an email on the computer.

INFERENTIAL—How does Hanna's grandma receive the email?

» Hanna's grandma's computer is connected to the internet.

Pages 30–31 **Ask students to look at the pictures on pages 30 and 31 as you read aloud.** Discuss how people use the internet for different reasons. Sometimes people use the internet for learning, and sometimes just for entertainment.


The internet is useful for many things.
You can use it to send and receive messages.
butterfly
You can search for answers to questions.
You can find music and movies.
30
Through the internet you can find games to play.
You can play some games with people in other places.
You can make video calls too.
People can also buy things on a computer device over the internet.
The map app on a smartphone uses the internet to find places.
31

Ask students the following questions:

LITERAL—What can you use the internet for?

» You can use the internet to send and receive messages, search for answers to questions, or find music and movies.

LITERAL—What are some ways you can connect with other people on the internet?

» You can play games with people in other places. You can also make video calls.

Pages 32–33

Ask students to look at the pictures on pages 32 and 33. Talk about how the internet is a large place and filled with people we don't know. Those people are strangers, and we must listen to adults we trust who will tell us when using the internet is okay.

Say: Sometimes people on the internet pretend to be people they are not in order to trick children. If you receive a message from someone you do not know or a message that makes you uncomfortable, don't answer it. Instead, show that message right away to an adult you trust. This is a very important way to stay safe on the internet.

There are a lot of things to do on the internet.
But you have to be careful using it.
People all over the world connect to the internet.
Most of them are strangers.
Children should only use computer devices on the internet with an adult's help.
Name: Michael
Password: xxxxxxxx
32

One way to stay safe online is to protect your privacy.
That means not telling anyone on the internet your real name.
Do not tell or show pictures of where you live.
Do not tell things about yourself to anyone you do not know.
Many computer devices are protected by passwords.
A password is a secret.
Only people who know the password can use the device.
Passwords can be letters, numbers, and symbols.
They should not be easy to guess.

33

Ask students the following questions:

LITERAL—Tell me ways you can protect yourself on the internet.

» You can protect yourself on the internet by not telling anyone your real name or where you live.

LITERAL—What is a password?

» A password is a secret that is used to protect a computer device.

3. Check for understanding.

Device-Based Activity

Tell students you want them to make a poster about using the internet. Ask them to draw pictures to show what the internet can be used for and how they can stay safe while using the internet. If possible, ask them to include labels with their pictures.

EXTEND—For students who may be interested, you can take them to your computer lab or classroom computer and have each of them compose an email to send home. Then each student can talk with family at home about sending email.

LESSON 6, PART 2

How Can We Use the Internet Safely?

At a Glance

Learning Objectives

- ✓ Recognize that computers can communicate over the internet.
- ✓ Explain why staying safe and respectful on the internet is important.
- ✓ Understand what a strong password means.

Instructional Activities

- whole-class discussion
- guided class activity

CSTA Standards

Concepts:

- Networks and the Internet
- Impacts of Computing

Subconcepts and Standards:

Network Communication and Organization: 1A-NI-04 Explain what passwords are and why we use them and use strong passwords to protect devices and information from unauthorized access.

Social Interactions: 1A-IC-17 Work respectfully and responsibly with others online.

Cybersecurity: 1A-IC-18 Keep login information private and log off of devices appropriately.

For detailed information about the CSTA Standards, follow the links in the Online Resources Guide for this unit:

www.coreknowledge.org/cksci-online-resources

Core Vocabulary and Language of Instruction

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Core Vocabulary terms are those that students should learn to use accurately in discussion. During instruction, expose students repeatedly to these terms but not through isolated drill or memorization.

communication **internet** **password** **respectful** **safe**

Language of Instruction consists of additional terms that you should use when talking about concepts in the lesson. Students benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves.

email **network** **private** **secure**

Materials and Equipment

- none

Advance Preparation

- Review the secret phrases, and create unique phrases and passwords as needed.

The Core Lesson

1. Focus attention on today's topic.

How can we use the internet safely? Ask students how computer devices, such as laptops, tablets, desktop computers, and smartphones, can share information with each other (These devices are connected through the internet.) Prompt students to share what the internet allows us to do, such as send messages or photos, make video calls, buy things, view maps, and play games with people who are very far away. We can watch nearly any movie we want. The internet also allows us to find information concerning just about anything! Discuss what it means to be safe and respectful when using the internet, such as using strong passwords and keeping them secure, as well as not communicating negatively.

2. Facilitate the activity.

Unplugged Activity

1. Have students stand in a few rows of 6 to 8. Tell them that they are going to communicate with each other like computer devices sending information on the internet.
2. Let them know the rule is that they can only send positive messages.
3. Whisper the secret message to the first student in each line: "The frog jumped over the cow" (or any other message you prefer).
4. Each of those students whispers the message in the ear of the next respective student, who then passes it on.
5. Like the game of telephone, the goal is for the last student in line to communicate the *original* message as accurately as possible. When the message reaches the end of each line, each of the last students whispers it to you, and you inform the class which lines had a clear network.
6. Each of the first students moves to the end of each respective line, and you start a new message for every line. This time use something more complex, such as, "The purple bunny climbed up the jagged mountain with a black backpack."
7. Ask students if the longer message was more challenging to communicate accurately.

8. Each of the first students again moves to the end of their respective lines, and this time start every line with a negative message, such as, "Harold doesn't like Edward." (Take care not to use names associated with your classroom or school.) Students should choose to not pass the negative message. Discuss the importance of not communicating negative messages over the internet.
9. Repeat the process, and this time tell the class that they will be sending a password. Tell the first student that the password is "puppy," and that they should pass it on.
10. Repeat the process, and this time tell the class that they will be sending a more difficult password, "K562HT9X?." Students should try to communicate that password down the line.
11. Create as many other messages or passwords as necessary so that every student gets a turn to start.

3. Check for understanding.

Unplugged Activity

Discuss the negative message with students, and ask them why it was important not to share that down the line. Ask students which password was easiest to communicate down the line, "puppy" or "K562HT9X." Why was the single, recognizable word so much easier to communicate and to remember? Discuss what makes a strong password, such as it being at least eight characters, being a combination of numbers, letters, and symbols, being hard to guess, etc.

CHALLENGE—Challenge students to create and communicate a strong password down their line. Give the first student in each line one letter. That student tells the next one in line the letter plus a number. The second student communicates the letter and number and adds another letter or number and so on. Can the last student in each line reveal the whole password?

Know the Standards

1A-NI-04 Explain what passwords are and why we use them, and use strong passwords to protect devices and information from unauthorized access. Learning to protect one's device or information from unwanted use by others is an essential first step in cybersecurity. Students are not required to use multiple strong passwords. They should appropriately use and protect the passwords they are required to use.

1A-IC-17 Work respectfully and responsibly with others online. Online communication facilitates positive interactions, such as sharing ideas with many people, but the public and anonymous nature of online communication also allows intimidating and inappropriate behavior in the form of cyberbullying. Students could share their work on blogs or in other collaborative spaces online, taking care to avoid sharing information that is inappropriate or could personally identify them to others. Students could provide feedback to others on their work in a kind and respectful manner and could tell an adult if others are sharing things they should not share or treating others in an unkind or disrespectful manner in online collaborative spaces.

1A-IC-18 Keep login information private and log off of devices appropriately. People use computing technology in ways that can help or hurt themselves or others. Harmful behaviors, such as sharing private information and leaving public devices logged in, should be recognized and avoided.

LESSON 7, PART 1

Game Devices

At a Glance

Learning Objective

✓ Recognize digital game devices as types of computers.

Instructional Activities

- teacher Read Aloud
- whole-class discussion

CSTA Standards

Concept: Computing Systems

Subconcept and Standard: Devices: 1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. (P1.1)

For detailed information about the CSTA Standards, follow the links in the Online Resources Guide for this unit:

www.coreknowledge.org/cksci-online-resources

Core Vocabulary and Language of Instruction

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video game

Language of Instruction consists of additional terms that you should use when talking about concepts in the lesson. Students benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves.

controller **device** **game console**

Instructional Resource

Student Book

Ch. 7

Student Book, Chapter 7
Game Devices

Materials and Equipment

Collect or prepare the following:

- internet access and the means to project images/video for whole-class viewing

The Core Lesson

1. Focus attention on today's topic.

Tell students that games are something that children and adults have enjoyed playing for a long time. Games can be played in different ways. Ask students: what ways can you play games? Guide students through a discussion that leads them to talk about playing games on devices.

2. Read together "Game Devices."

Student Book

Ch. 7

While some students may be able to read words on a given page of the Student Book, students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

Read Aloud Support

Ask students to turn to pages 34 and 35 of the Student Book and look at the images as you read aloud. Remind them that the title of this chapter is "Game Devices," and tell them to pay special attention to the devices that people can use to play games as you read.

Pages 34–35 **Ask students to look at the pictures on pages 34 and 35.** Talk about what they notice about what game devices can look like and where people might play them.

CHAPTER 7

Game Devices

Computers, tablets, and phones can have games.
There are also computer devices made for games.
Those are called game consoles.
Some video game consoles stay in one place.
They connect to a TV to display the games.
Others are small and can be carried around.
You can hold the device in your hands to play.

34

35

Ask students the following questions:

LITERAL—What devices can games be played on?

» Devices that games can be played on include computers, tablets, smartphones, and video game consoles.

INFERENTIAL—Are all game devices the same?

» No they are not. Some video game consoles stay in one place connected to a TV, and others are small enough to be carried around.

Pages 36–37 **Ask students to look at the pictures on pages 36 and 37 as you read aloud.** Explain that these pictures show the different types of controllers that game devices can have. Have students pay close attention to the buttons on the controllers, and tell them these buttons are important to how the controller works.

You put information into a computer.
You use a keyboard or a mouse.
You put information into a laptop using a trackpad.
You put information into a tablet or smartphone using a touchscreen.
A game console is also a computer device.
To play games, you must put information into the device.
You use a controller that goes with the console.
36
Game devices have different controllers.
But they do the same things as a keyboard and a mouse.
Controllers let you put information into the device.
Players hold controllers in their hands to play games.
Most controllers have buttons to click.
The buttons move objects on the screen.
Other controllers have a stick or a steering wheel to use.
37

Ask students the following questions:

LITERAL—What do video game device controllers do?

» They let you put information into a computer device just like you can using a keyboard and mouse.

LITERAL—What do buttons on controllers do?

» When buttons are pushed, they can move objects up, down, and to the sides on screens.

3. Check for understanding.

Unplugged Activity

Tell students they are going to draw a controller for a new video game device. They can make the controller any shape they want, but it must have buttons so that the user can input information to the device. Have students draw their controller and label the buttons in terms of usage (e.g., start button labeled as "Start").

LESSON 7, PART 2

How Is a Controller Like a Mouse?

At a Glance

Learning Objective

✓ Understand the basic functionality of a game controller.

Instructional Activities

- whole-class discussion
- guided class activity

CSTA Standards

Concept: Hardware and Software

Subconcept and Standard: Devices: 1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. (P1.1).

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game controller

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button **jump** **left** **move** **repeat** **right**

Materials and Equipment

Collect or prepare the following:

- whiteboard
- large open classroom space

Advance Preparation

- Draw a simple game controller on the whiteboard as shown. Be sure the sample sketch contains the four directional arrows and two buttons with labels A and B.

- If possible, temporarily move desks and tables around to create more open space.

The Core Lesson

1. Focus attention on today's topic.

How do you move things on a screen with a game controller? Ask students to share if they have ever played a game on a gaming device. Games are a fun way to learn and play with others, and they can be played on all types of computer devices. Instead of a mouse or a trackpad, some games are played using a special device called a game controller. Point to the drawing on the board, and ask students if they have ever seen or used a game controller and what it does. Game controllers are held in players' hands and have buttons with symbols and other controls that can move objects around on a screen.

2. Facilitate the activity.

Unplugged Activity

1. The whole class stands up in as much open space as is available. If space is limited, do the activity with one small group at a time.
2. Tell students that they are in a video game and that the game controller is going to tell them how to move!
3. Point to the ⬆ symbol, and instruct students to take a step forward.
4. Point to the ⬇ symbol, and instruct students to take a step back.
5. Point to the ⬅ symbol, and instruct students to take a step left.
6. Point to the ➡ symbol, and instruct students to take a step right.
7. Point to the **A** button, and instruct students to jump up.
8. Point to the **B** button, and instruct students to duck down.

9. After students are comfortable with the movements, draw a short sequence on the board for them to follow. For example:

10. Tell them to get ready to do the steps in order . . . and then GO!
11. Add a few more steps to make the activity more challenging.
12. Now add a repeat sign to a short sequence, such as:

    Explain that students should keep repeating the same sequence in a loop.

13. Time permitting, let students create short sequences for each other.

3. Check for understanding.

Unplugged Activity

Ask students to share their favorite video game with the class and how they made things happen on the screen. Did they use a mouse, a trackpad, a game controller, or some other device to play the game?

CHALLENGE—Challenge students to create game controller sequences for each other to safely get from one place to another in the classroom. Tell them to work together to test out their sequences and make changes if needed to complete their goals.

Know the Standards

1A-AP-08 Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks. Composition is the combination of smaller tasks into more complex ones. Students could create and follow algorithms for making simple foods, brushing their teeth, getting ready for school, or participating in cleanup time.

1A-AP-10 Develop programs with sequences and simple loops to express ideas or address a problem. Programming is used to create technological products that reflect a wide range of interests. Control structures specify the order in which instructions are executed within a program. A sequence is the order of instructions in a program. For example, if dialogue is not sequenced correctly when programming an animated story, the story will not make sense. If the commands to program a robot are not in the correct sequence, the robot will not complete the task desired. Loops allow for the repetition of a sequence of code multiple times. For example, in a program to show the life cycle of a butterfly, a loop could be combined with move commands to animate repetitive changes in the lives of butterflies.

1A-AP-11 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions. Decomposition is the act of breaking down tasks into simpler ones. Students could break down the steps needed to make a peanut butter and jelly sandwich, to brush their teeth, to draw a shape, to move a character across a screen, or to solve a level of a coding app.

1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops. Algorithms or programs may not always work correctly. Students should be able to use various strategies, such as changing the sequence of steps, following the algorithm in a step-by-step manner, or trial and error to fix problems in algorithms and programs.

LESSON 8, PART 1

Telling Computers What to Do

At a Glance

Learning Objective

✓ Recognize a range of computer capabilities.

Instructional Activities

- teacher Read Aloud
- whole-class discussion

CSTA Standards

Concept: Computing Systems

Subconcept and Standard: Devices: 1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. (P1.1)

For detailed information about the CSTA Standards, follow the links in the Online Resources Guide for this unit:

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screen **scroll**

Language of Instruction consists of additional terms that you should use when talking about concepts in the lesson. Students benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves.

keyboard **mouse** **swipe**

Instructional Resource

Student Book

Ch. 8

Student Book, Chapter 8
Telling Computers What to Do

Materials and Equipment

Collect or prepare the following:

- internet access and the means to project images/video for whole-class viewing

The Core Lesson

1. Focus attention on today's topic.

Ask students to recall the different types of devices they have learned about. Praise them for recalling the devices they have learned about this chapter. Then ask them to turn and talk to a partner and tell their partner how the devices probably work.

2. Read together "Telling Computers What to Do."

Student Book

Ch. 8

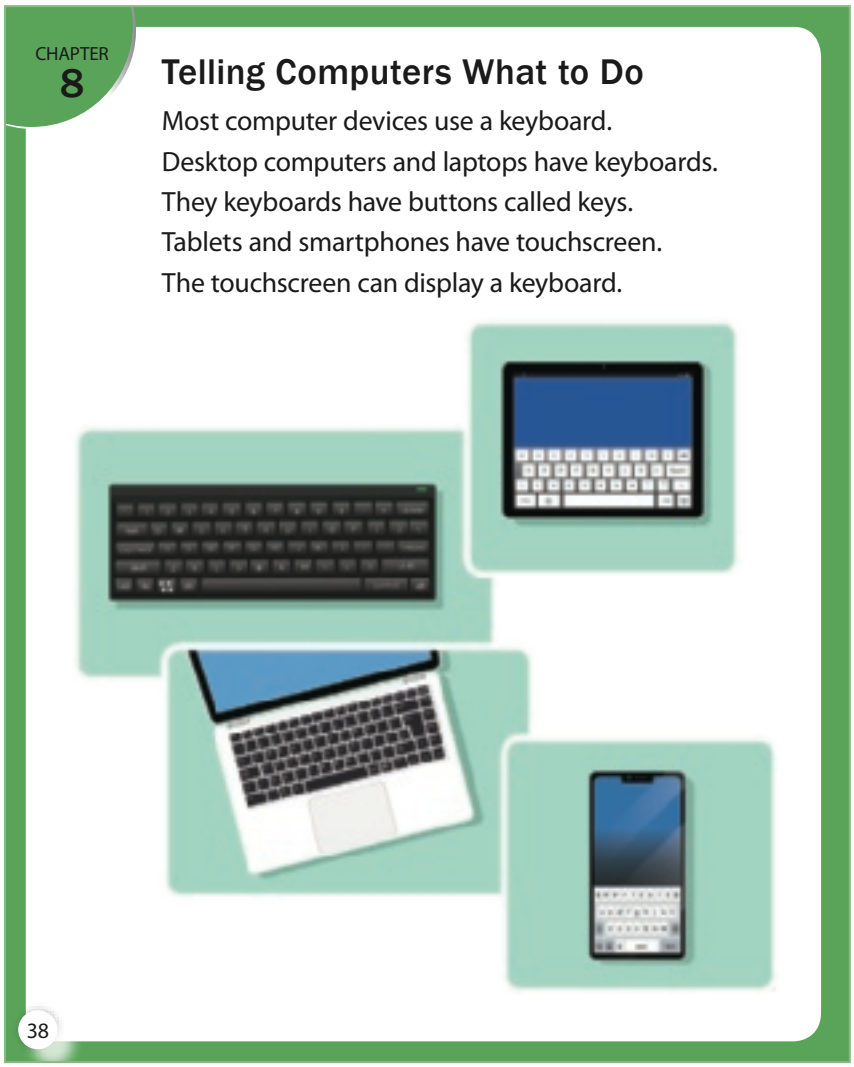
While some students may be able to read words on a given page of the Student Book, students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

Read Aloud Support

Ask students to turn to page 38 of the Student Book and look at the images as you read aloud. Remind them that the title of this chapter is "Telling Computers What to Do," and tell them to pay special attention to how computers are working as you read.

Page 38

Ask students to look at the pictures on page 38 as you read aloud. Discuss how devices often have keyboards for people to type on.


CHAPTER
8
Telling Computers What to Do
Most computer devices use a keyboard.
Desktop computers and laptops have keyboards.
They keyboards have buttons called keys.
Tablets and smartphones have touchscreen.
The touchscreen can display a keyboard.
38

Ask students the following questions:

INFERENTIAL—How are desktop computer and laptop keyboards different from tablet and smartphone keyboards?

» Desktop computers and laptops use keyboards with buttons, whereas tablets and smartphones only have touchscreen keyboards.

EVALUATIVE—What are keyboards used for?

» Keyboards are used to type messages to people or to type in information to search.

Page 39

Ask students to look at the pictures on page 39. Talk about what they notice about the buttons on the keyboard.

Keyboards have letters, numbers, and symbols.
Some keyboards separate pads of numbers.
The arrow buttons can move the pointer on the screen.
The movement can be up, down, or sideways.
39

Ask students the following questions:

LITERAL—What do keyboards have?

» Keyboards have letters, numbers, and symbols.

EVALUATIVE—When do you think you would need to use the arrow keys?

» Student answers will vary.

Page 40

Ask students to look at the pictures on page 40. Tell students to listen carefully to the ways computer devices are the same or different.

Some computer devices stay in one place.
Others can be carried around.
Some do many things.
Others do just a few things.
Some use the internet, and some do not.
But computer devices are the same in some ways.
People must tell computers what to do.
To tell a computer what to do, you select things on the screen.
A mouse moves a pointer on a screen.
A trackpad or game controller does the same thing.
You select objects by clicking on them.
Or you choose objects on a touchscreen by touching them.
You touch or click on app icons to open them.

40

Ask students the following questions:

LITERAL—How are computer devices different?

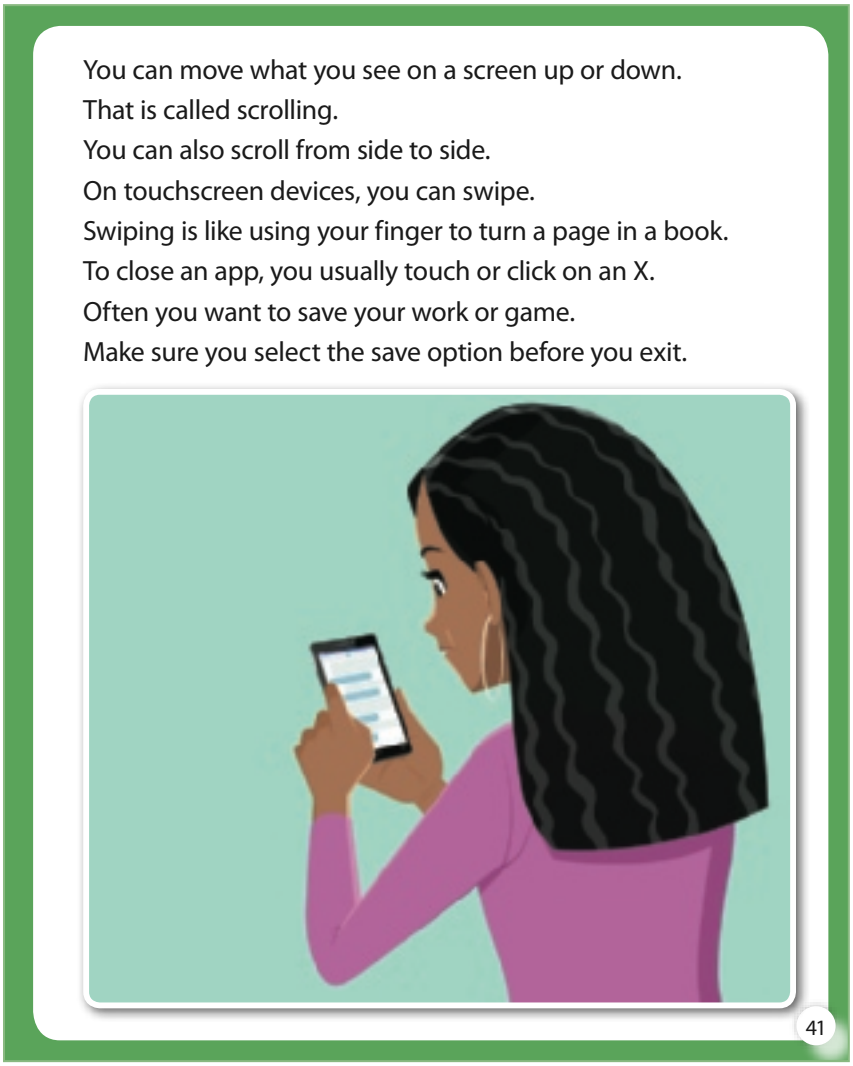
» Some stay in one place, while others can be carried around. Some do many things, while others do just a few. Some use the internet, while others do not.

LITERAL—What is the same about computer devices?

» People must tell computers what to do.

Page 41

Ask students to look at the picture on page 41. Explain that it shows the smartphone scrolling feature that is used to look through information.


You can move what you see on a screen up or down.
That is called scrolling.
You can also scroll from side to side.
On touchscreen devices, you can swipe.
Swiping is like using your finger to turn a page in a book.
To close an app, you usually touch or click on an X.
Often you want to save your work or game.
Make sure you select the save option before you exit.
41

Ask students the following questions:

LITERAL—What is scrolling?

» Moving what you see on a screen up and down.

LITERAL—What is swiping?

» Swiping is scrolling on touchscreen devices.

3. Check for understanding.

Unplugged Activity

Display a desktop computer and a tablet, and ask students to describe how the two devices are alike and how they are different.

LESSON 8, PART 2

Typing, Pointing, and Clicking

Driving Question: What are computers, and where can we find them?

Overarching Unit Objective: Identify computer devices and parts, and operate them age-appropriately.

At a Glance

Learning Objective

✓ Identify various ways that information can be input into a computing device.

Instructional Activities

- whole-class discussion
- guided class activity

CSTA Standards

Concept: Computing Systems

Subconcept and Standard: Devices: 1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. (P1.1)

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information **keyboard** **printer** **screen** **type**

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input **mouse** **scroll** **swipe** **touchscreen**

Materials and Equipment

Collect or prepare the following:

- whiteboard
- large stack of blank paper
- tape

Advance Preparation

- Clear space on the classroom floor to open up as much space as possible.

The Core Lesson

1. Focus attention on today's topic.

How do you tell a computing device what to do? Ask students how they would tell a laptop or a desktop what to do (mouse movement to click, select, and scroll; pressing numbers, letters, and symbols on a keyboard). Ask them to describe how they would tell a tablet or a smartphone what to do (swiping, tapping, and touching information on the screen). What about a game controller (pressing buttons or moving a joystick)? Ask if anyone has seen or used a device that has a voice controller. Discuss how no matter what type of device is being used—computer, tablet, smartphone, or game console—a computer device must be given input in order to know what to do.

2. Facilitate the activity.

Online Resources

Unplugged Activity

1. Demonstrate a standard keyboard using a classroom computer if available. If not, show a printed or online image of a QWERTY keyboard. (See the Online Resource Guide for suggested images. **www.coreknowledge.org/cksci-online-resources**)
2. Ask students what happens when a letter key is pressed. The same letter appears on the computer screen.
3. Point out that the keyboard is not in alphabetical order. Explain that the most common keys are in the easiest places to reach when someone is typing.
4. Pass out a blank sheet of paper to each student, and tell the students to keep it in the portrait (vertical) orientation. Tell them they are going to make their own extra large keyboard.
5. Give each student a letter of the alphabet, and tell them to create a big, bold uppercase version of that letter on their paper. Students should keep their letter keys black and white. If there are not 26 students in the class, ask some students to create more than one letter.
6. When all students have completed their keys, instruct them to work together to recreate a standard QWERTY keyboard on the floor.
7. After students put the pieces in the correct order, they will use tape to secure the keys together.
8. When the floor keyboard is finished, assign one student to be the screen, one student to be the processor, one student to be the typer, and one student to be the printer.

9. Tell the typer to think of a three- or four-letter word they know how to spell (or maybe their name). Using hands or feet (with shoes off), the typer presses a letter on the floor keyboard.
10. The processor looks at what is being pressed and tells the screen to write that letter on the whiteboard. The typer continues by pressing the rest of the letters in the word.
11. The processor then reads the word that has been created by the screen and tells it to the printer, who writes the word on a blank sheet of paper and shows it to the class.
12. Change roles so that all of the students get a chance to fill as many roles as possible.

3. Check for understanding.

Unplugged Activity

Ask students to describe how a computer gets information from people in order to complete tasks. Prompt them to compare the type of information a keyboard gives a computer with that given by a game controller. Ask them to describe how the letters transferred from the keyboard to the screen to the printed page.

CHALLENGE—Challenge students by creating keyboard pages for numbers 1–9. Also create a + page and an = page. Without using a "shift" key, guide the typer and the screen to create simple addition problems on the board, such as 2 + 1 =. Other students will raise their hands to predict the answers.

Know the Standards

1A-DA-05 Store, copy, search, retrieve, modify, and delete information using a computing device, and define the information stored as data. All information stored and processed by a computing device is referred to as data. Data can be images, text documents, audio files, software programs or apps, video files, etc. As students use software to complete tasks on a computing device, they will be manipulating data.

1A-DA-06 Collect and present the same data in various visual formats. The collection and use of data about the world is a routine part of life and influences how people live. Students could collect data about the weather, such as sunny days versus rainy days, the temperature at the beginning of the school day and the end of the school day, or the inches of rain over the course of a storm. Students could count the number of pieces of each color in a bag of candy. Students could create surveys of things that interest them, such as favorite foods, pets, or TV shows, and collect answers to their surveys from their peers and others. The data collected could then be organized into two or more visualizations, such as a bar graph, a pie chart, or a pictograph.

1A-DA-07 Identify and describe patterns in data visualizations, such as charts or graphs, to make predictions. Data can be used to make inferences or predictions about the world. Students could analyze a graph or a pie chart of the colors in a bag of candy or the averages for colors in multiple bags of candy, identify the patterns for which colors are most and least represented, and then make predictions as to which colors will appear most and least in a new bag of candy. Students could analyze graphs of temperatures taken at the beginning of the school day and the end of the school day, identify patterns for when temperatures rise and fall, and predict if they think the temperature will rise or fall at a particular time of the day based on patterns observed.

GRADE K

Teacher Resources

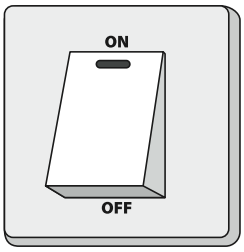
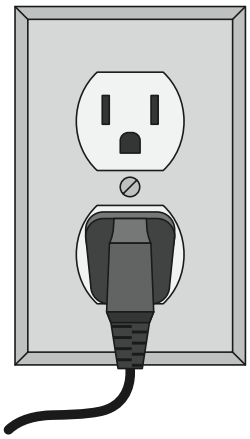
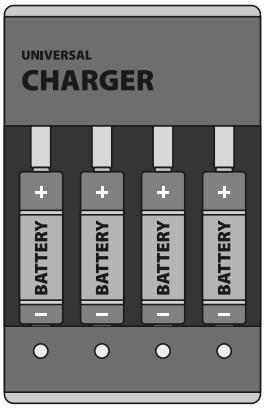
Activity Pages

- Electronic Device Scavenger Hunt (AP 1.2) **92**
- Parts of a Computer (AP 2.2) **93**
- Laptops (AP 3.2) **94**
- Old Devices, New Apps (AP 5.2) **95**

Name _____ Date _____

Activity Page 1.2 Use with Lesson 1.2

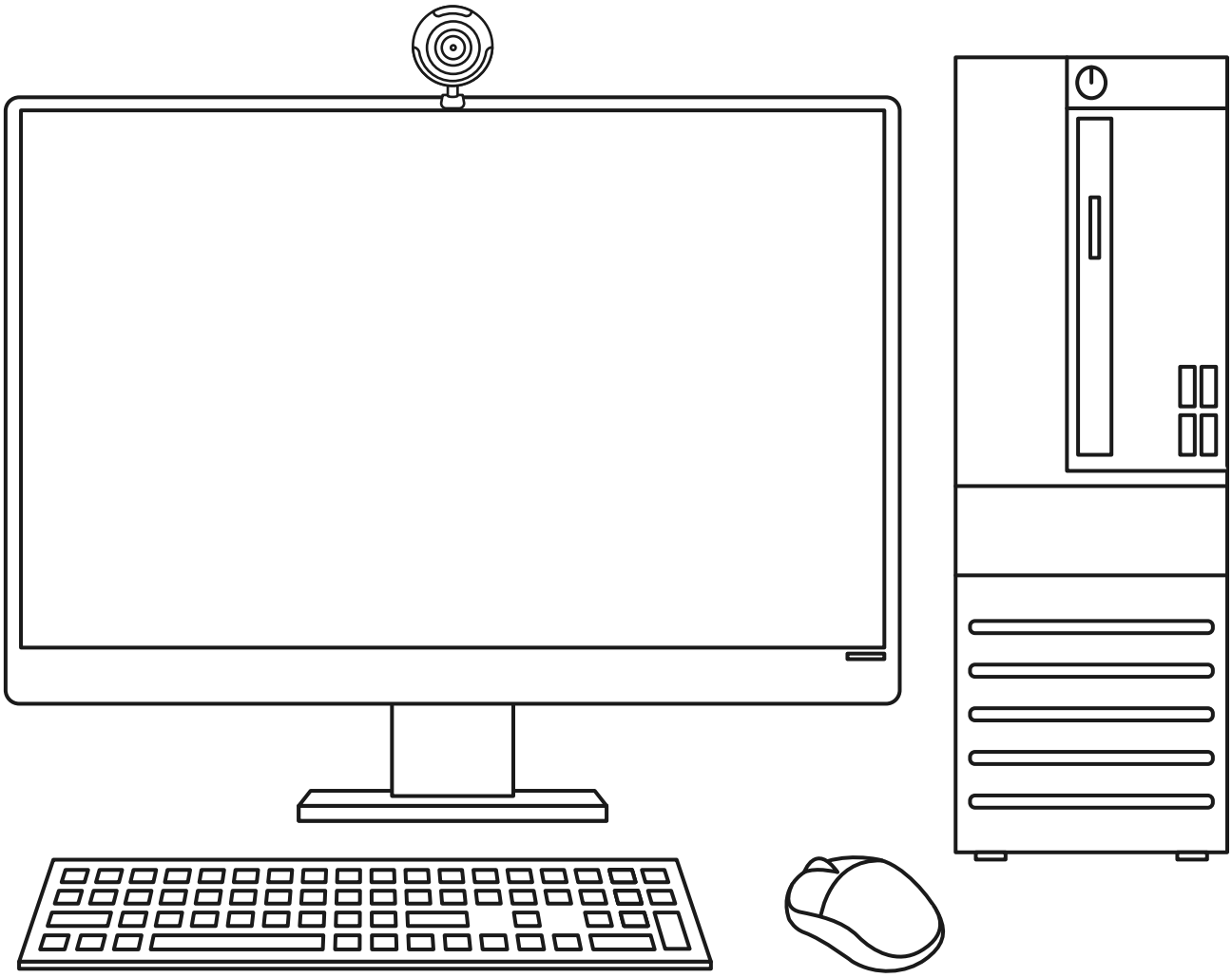
Electronic Device Scavenger Hunt

Electronic Device Type	Findings	Total Found
Switches 		
Plugs 		
Batteries 		
	Total Devices Found:	
	Total Devices with Input:	

Name _____ Date _____

Activity Page 2.2 Use with Lesson 2.2

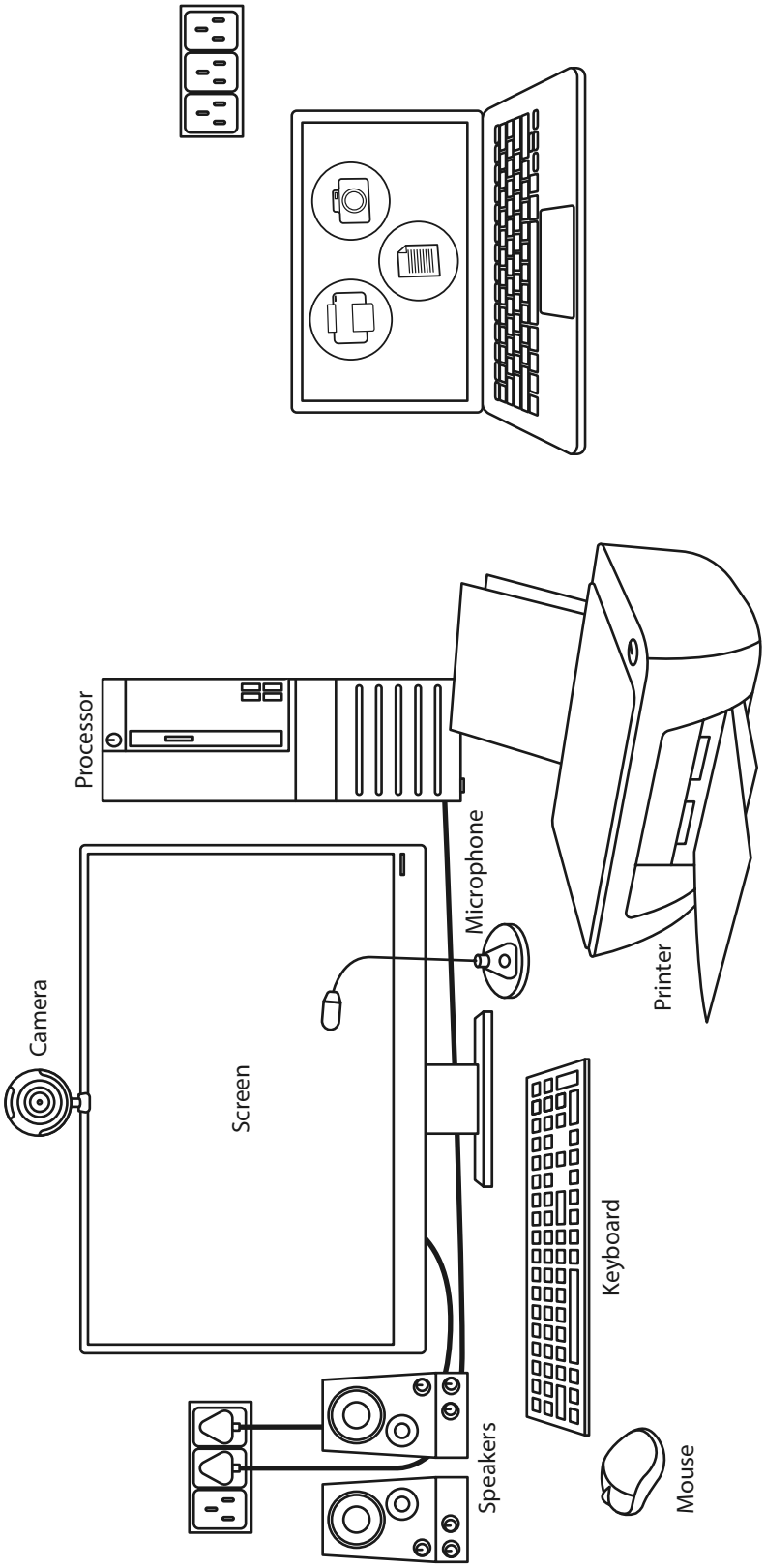
Parts of a Computer



Name _____ Date _____

Activity Page 3.2 Use with Lesson 3.2

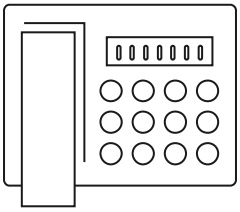
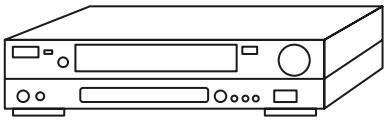
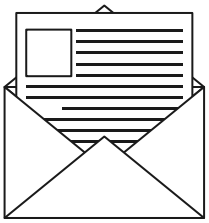
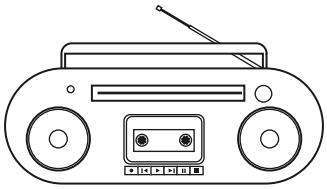
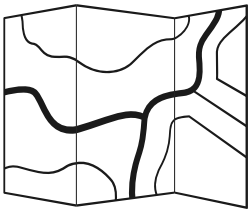
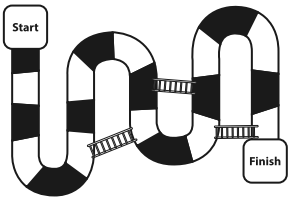
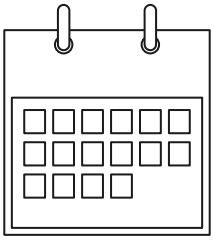
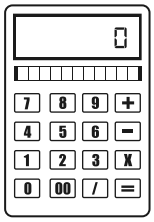
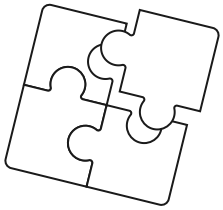
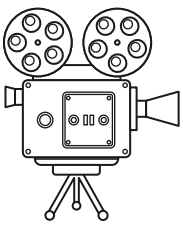
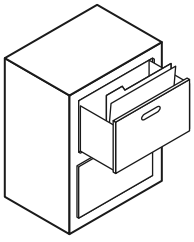
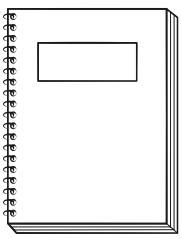
Laptops



Name _____ Date _____

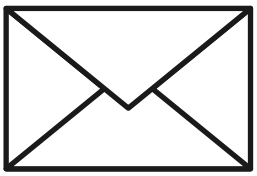
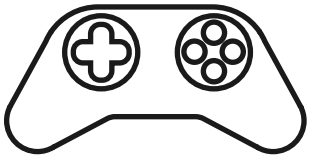
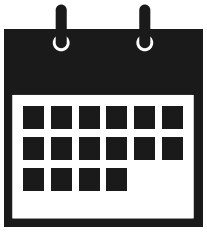
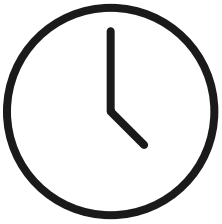
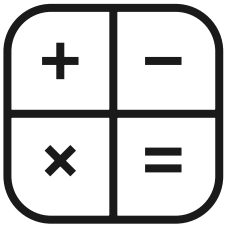
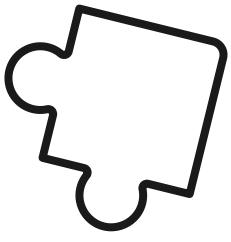
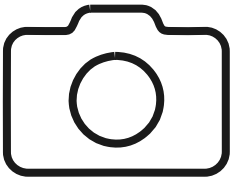
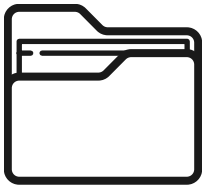
Activity Page 5.2 Use with Lesson 5.2

Old Devices, New Apps

Alarm clock	Push-button telephone 	VCR or DVD player 
Paper mail 	Tape or record player 	Paper map 
Board game 	Calendar 	Digital or analog clock
Calculator 	Jigsaw puzzle 	Encyclopedia set
Film camera 	File cabinet 	Spiral notebook 

Name _____ Date _____

Old Devices, New Apps

Alarm icon	Phone icon	Video streaming "play" icon
Message icon 	Music icon	Map icon
Game icon 	Calendar icon 	Clock icon 
Calculator icon 	Puzzle icon 	Internet icon
Camera icon 	File icon 	Notepad icon

Appendix A

Glossary

Green words and phrases are Core Vocabulary terms for the unit. **Bold-faced words and phrases** are additional vocabulary terms related to the unit that you should model for students during instruction and that are often used within the Student Book and these latter terms do not have specific page numbers listed. Vocabulary words are not intended for use in isolated drill or memorization.

A

app, n. a short name for application, which are computer programs

advancement, n. an improvement; something that makes a thing better

B

battery, n. objects that store energy until it is needed by devices

button, n. a small object that is pressed in order to make something happen

C

camera, n. a devices used for taking pictures

components, n. parts of something

communication, n. talking or sharing information with others

computer, n. an electronic device that is used to do many different things

controller, n. an object or device that lets someone play video games or control another device

D

desktop computer, n. a computer that stays in one place, usually on a desk or table

device, n. an object or tool that turns on and off and is used to do a certain job, such as a cell phone or flashlight

E

electronic, n. an object that needs electric power to work

email, n. a message or letter sent from one device to another

G

game console, n. a machine with special controllers used to play video games

game controller, n. an object that is used to play a video game

H

headphones, n. devices that people wear over their ears. They let people listen to sounds and music.

I

icon, n. small pictures that show the apps on the monitor

information, n. knowledge or facts that is given or received

internet, n. many computers all over the world that are connected together and share information with each other

J

jump, v. to leap up or spring into the air

K

keyboard, n. a computer device with buttons for letters, numbers, and symbols. When the keys are pushed, it sends information to the computer

L

laptop, n. a computer that can be carried with you

left, n. a direction or position that is on the side of the body where the heart is located

M

monitor, n. a device that looks like a tv, with a flat surface that shows words and pictures

mouse, n. a small tool used with computers. The person using the computer moves the mouse to point at, select, and move items on the screen.

move, v. to change position or place

N

network, n. a group of computers that are linked together

notebook, n. another word for a computer that can be carried with you

O

on and off, adv. when an object or device is working and not working

online, adj. connected to the internet

outlet, n. a place, usually in a wall, that connects electrical devices to electric power

P

password, n. a secret word or phrase that keeps people and things safe

plug, v. to attach a device into an outlet so it can get the energy to work

printer, n. a machine that prints information from the computer, like letters and pictures

portable, adj. can be carried or easily moved

power, n. energy that turns devices on and off and lets them work

private, adj. not to be shared; only certain people should know about it

processor, n. a part of the computer that makes the computer work

R

rechargeable, adj. an object, like a battery, that can filled up again with electrical energy

replacement, v. a thing that takes the place of another or takes over for something else

represent, v. to stand for or mean something else

respectful, adj. being polite and nice, acting in ways that show you care about others

right, n. a direction or position that is on the opposite side of the body where the heart is located

S

safe, adj. careful, not going to get hurt or lost

screen, n. the part of the device that shows pictures and words

scroll, v. to move what you see on a screen up or down or side to side

smartphone, n. devices that can be carried around; are smaller than tablets

speakers, n. a device that makes sound

stationary, adj. does not move

swipe, v. using your finger on a screen to move what you see

switch, n. an object or button that turns things on and off

symbol, n. an object or picture that stands for something else

system, n. a group of different things that work together

T

tablet, n. a small, flat computer that is used by touching the screen

telephone, n. a device used to communicate with people who are far away

touchscreen, n. a screen on a computer, tablet, or phone that can be used by touching it

trackpad, n. a small pad that does the same job as a mouse. It has a special surface that a person slides fingers on to move items on the computer screen.

type, v. write by pushing buttons on a keyboard

V

video, n. moving pictures that often have sound

video call, n. a call made using the camera on a device so everyone on the call can see each other as they talk

video game, n. a game that is played on a computer or other device

voice call, n. talking to another person on a smart phone or other device

Appendix B

Internet Safety

Though online resources present many rich opportunities for student learning, unsupervised online activity for children is not advised. The U.S. Department of Justice provides the following guidelines, Keeping Children Safe Online:

- **Discuss internet safety and develop an online safety plan** with children before they engage in online activity. Establish clear guidelines, teach children to spot red flags, and encourage children to have open communication with you.
- **Supervise young children's use of the internet**, including periodically checking their profiles and posts. Keep electronic devices in open, common areas of the home, and consider setting time limits for their use.
- **Review games, apps, and social media sites** before they are downloaded or used by children. Pay particular attention to apps and sites that feature end-to-end encryption, direct messaging, video chats, file uploads, and user anonymity, which are frequently relied upon by online child predators.
- **Adjust privacy settings and use parental controls** for online games, apps, social medial sites, and electronic devices.
- **Tell children to avoid sharing personal information, photos, and videos online** in public forums or with people they do not know in real life. Explain to your children that images posted online will be permanently on the internet.
- **Teach children about body safety and boundaries**, including the importance of saying "no" to inappropriate requests both in the physical world and the virtual world.
- **Be alert to potential signs of abuse**, including changes in children's use of electronic devices, attempts to conceal online activity, withdrawn behavior, angry outbursts, anxiety, and depression.
- **Encourage children to tell a parent, guardian, or other trusted adult** if anyone asks them to engage in sexual activity or other inappropriate behavior.

Copy and distribute the Student Safety Contract, found on the next page. Prior to the start of the first lesson, do a read-along, and have students agree to the expectations for when they engage in computer and online activities.

Online Resources

For additional support for safety in the computer science and online instruction, follow the links in the Online Resources Guide for this unit:

www.coreknowledge.org/cksci-online-resources

Student Online Safety Contract

Dear Parent or Guardian,

During computer science class, we want to create and maintain a safe classroom. With this in mind, we are making sure students are aware of the expectations for their behavior while engaged in computer science activities. We are asking you to review the safety rules below with your student and sign this contract. If you have any questions, please feel free to contact me.

For important safety information about children, computers, and the internet, consider resources at these sites:

https://protectyoungeyes.com/

https://sharedhope.org/

https://www.justice.gov/coronavirus/keeping-children-safe-online

_____ _____/_____/_____/

Teacher signature and date

_____ _____/_____/_____/

Parent or guardian signature and date

When doing online activities, I will do the following:

- Only do online activities with the supervision of an adult.
- Only visit websites and use apps that I am guided to by my teacher, parent, or trusted adult guardian.
- Never use my real name or reveal personal information if I communicate with others online.
- Tell a trusted adult right away if anyone online asks questions about my name, where I live, or where I go to school.
- Be careful around electronic devices and only plug them in or unplug them when an adult is supervising.

I understand and agree to the safety rules in this contract.

_____ _____/_____/_____/

Student signature and date

_____

Print name

Appendix C

Strategies for Acquiring Materials

The materials used in the Core Knowledge Computer Science program are readily available and can be acquired through both retail and online stores. Some of the materials will be reusable and are meant to be used repeatedly. This includes items such as plastic cups that can be safely used again. Often these materials are durable and will last for more than one activity or even one school year. Other materials are classified as consumable and are not able to be used more than once.

Online Resources

The Material Supply List for this unit's activities can be found online. Follow the links in the Online Resources Guide for this unit:

www.coreknowledge.org/cksci-online-resources

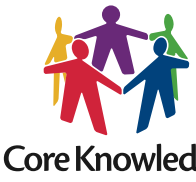
Ways to Engage with Your Community

The total cost of materials and technology can add up for an entire unit, even when the materials required for activities and demonstrations have been selected to be individually affordable. And the time needed to acquire the materials adds up too. Reaching out to your community to help support STEM education is a great way to engage parents, guardians, and others with the teaching of science and computer science, as well as to reduce the cost and time of collecting the materials. With that in mind, the materials list can be distributed or used as a reference for the materials teachers will need to acquire to teach the unit.

Consider some of the following as methods for acquiring the science materials:

- School Supply Drive—If your school has a supply drive at any point in the year, consider distributing materials lists as wish lists for the science department.
- Open Houses—Have materials lists available during open houses. Consider having teams of volunteers perform an activity to show attendees how the materials will be used throughout the year.
- Parent-Teacher Organizations—Reach out to the local PTO for assistance with acquiring materials.
- Science Fair Drive—Consider adding a table to your science fair as part of a science materials drive for future units.
- College or University Service Project—Ask service organizations affiliated with your local higher education institutions to sponsor your program by providing materials.
- Local Businesses—Some businesses have discounts for teachers to purchase school supplies. Others may want to advertise as sponsors for your school/programs. Usually you will be asked for verifiable proof that you are a teacher and/or for examples of how their sponsorship will benefit students.

Remember: If your school is public, it will be tax exempt, so make sure to have a Tax Identification Number (TIN) when purchasing materials. If your school is private, you may need proof of 501(c)(3) status to gain tax exemption. Check with your school for any required documentation.



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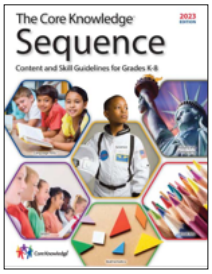

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